

Big bucks in T-1 mux

The T-1 market is moving off the back burner.

BY PAUL KORZENIOWSKI
Senior Editor

The Integrated Services Digital Network is more theory than reality.

While engineers debate ISDN's various technical mer-

its, communications managers go about their business, knowing that it is not a solution for them today.

However, managers are utilizing a precursor to ISDN — T-1 facilities. T-1 supplies

Continued on page 29

AT&T TERMINATION CHARGES

City challenges industry Goliath

BY BOB WALLACE
Senior Writer

A large Massachusetts municipality faced with up to \$40,000 in AT&T termination charges is forcing the communications giant to show the legality of the charges and may take the company to court.

The city is one of several thousand users throughout the nation that are deciding whether to pay termination
See Termination page 5

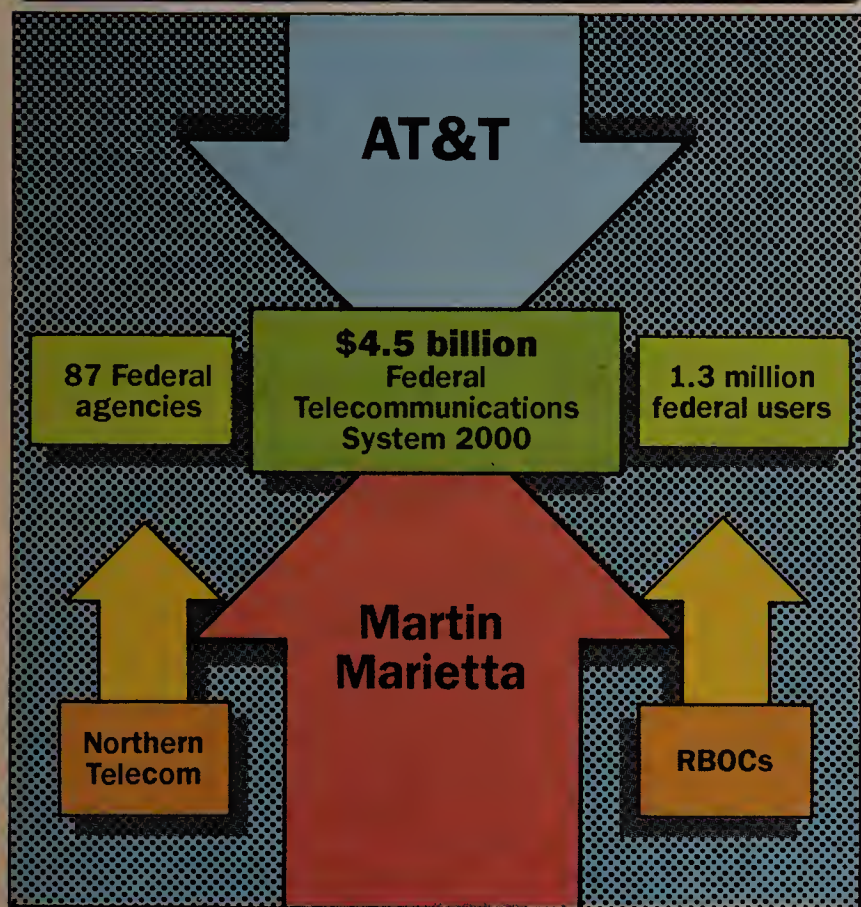
NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

VOLUME 3, NUMBER 20

JULY 21, 1986

**Martin Marietta
arms itself in bidding for the
Federal Telecommunications System**



FEDERAL TELECOM SYSTEM

Coalition seeks huge FTS contract

Martin Marietta, NT, RBOCs team up.

BY KARYL SCOTT
Washington, D.C. Correspondent

BETHESDA, Md. — Martin Marietta Corp. last week formed a powerful, unprecedented industry coalition with Northern Telecom, Inc. and the seven regional Bell operating companies in a bid to win the \$4.5 billion, 10-year Federal Telecommunications System (FTS) 2000 contract from the federal government.

Martin Marietta will act as the prime contractor in the bidding process in direct competition with AT&T, which holds the current FTS contract.

Martin Marietta would be responsible for the overall system, including integration and management of the nationwide

voice, data and video network.

Deregulation of the telecommunications industry, coupled with the age of the current system, prompted the General Services Administration (GSA) of the federal government to announce in February 1985 that it was looking for a new system.

The GSA made clear in its initial request for proposal that, instead of installing another private network, it wanted to turn ownership and operation responsibility over to a third party. The winner of the contract will provide telecommunications service to some 1.3 million federal telephone users in 50 states.

Northern Telecom, the U.S. subsidiary of the Canadian-based telecommunications
See Martin Marietta page 5

NETWORK LINE

News

Codex adds a new low-end model to its 4800 network management product line, taking aim at the needs of medium-size companies. Page 2.

Intelsat unwraps a prototype satellite that offers on-board switched time-division multiple access signaling technique. Page 2.

AT&T's response to the beefed up access tariffs of New York Telephone and New England Telephone is its own 20% increase in charges for local private lines terminating

in New York and New England. Page 2.

Farmland Industries hopes to slash \$73,000 from its monthly private-line bills by using Vsat service and implementing "Lata-pure" network configurations. Page 4.

As a result of skyrocketing costs, Ford Aerospace is reassessing its strategy to offer satellite transponders to service providers. Page 5.

Features

Northern Telecom and its CEO, Edmund B. Fitzgerald, must decide whether to boost Northern Tel's shrinking income or purchase a communications company. Page 24.

TELECOM MANAGEMENT

Maverick users stock networks

BY MARGIE SEMILOF
Senior Writer

Keeping tabs on existing network equipment is a tough enough job. But when end users buy new products without consulting the communications manager, the task of accounting for network components can become downright impossible.

Most managers agree it is critical to corral this unchecked buying activity if a corporation's goal is to ensure that all network components work together.

Users who instigate such purchases are typically a company's most technically sophisticated communications users who are tempted by technology at seminars, through
See Keeping tabs page 34

► CODEX 4840

Codex hits mid-range net management mart

BY PAUL KORZENIOWSKI
Senior Editor

MANSFIELD, Mass. — Codex Corp. took dead aim at the network management needs of medium-sized companies last week when it added a new low-end model to its 4800 product line. The Codex 4840, the third member of the 4800 line, supports up to 248 lines and sells for approximately \$50,000.

McCormack & Dodge Corp., a Natick, Mass.-based software vendor, beta-tested the system and is pleased with its initial performance.

The 4800 line is based on various models of Data General Corp.'s MV line of superminicomputers. The new 4840 is powered by a DG MV/2000, which can be configured with up to 120M bytes of hard-disk storage and 2M bytes of main memory.

As with other products in the 4800 family, circuits are supported by Distributed Network Processors that support from 20 to 128 lines. The 4840 can support two of these processors. Up to four network management terminals can be used with the new system.

The 4840 was designed to work with the company's 2600 line of diagnostic modems, which operate at speeds up to 19.2K bit/sec. Wrap-around boxes for use with nondiagnostic modems are available for other vendor's modems. Like most modem vendors, Codex uses out-of-band signaling to send its diagnos-

tic information to the central network management system and is therefore incompatible with other signaling techniques, such as IBM's in-band signaling.

The 4840 supports four types of management functions — site management, equipment management, problem management and alarm management. Site management stores configuration information concerning various locations on the network. The equipment management function supplies a network manager with an inventory of all the products used on the network. Problem management supplies an on-line description of any faulty connection. Alarm management lists the type and frequency of any network alarm condition.

The 4840 includes a report generator that enables users to design their own reports.

McCormack & Dodge began looking for a network management system. See **Net management** page 35

Network World wants to make its news coverage even better, and for that we ask your help. If you learn about an interesting event that just occurred or is just about to occur, please call.

We'd also like you to tell us about how you're optimizing your networks.

Call *Network World* Editor Bruce Hoard toll free at (800) 343-6474, extension 332.

► PRIVATE LINE SERVICE

AT&T in \$40 million hike BOC special access increases are cause.

BY MICHAEL FAHEY
Staff Writer

As a result of special access tariff increases being sought by New York Telephone Co. and New England Telephone & Telegraph Co., AT&T plans to seek a 20% increase on the local channel portion of private-line service terminating in New York and New England.

The higher private-line prices would take effect July 24 and would increase AT&T's revenue by about \$40 million per year. The company justifies the rate hikes as an effort to cover its increased access costs.

A company spokesman said the proposed rates would pass the increase in local channel costs that the two Bell operating companies plan to charge AT&T onto private line customers. He stressed the 20% increase would affect only the local channel portion of private lines terminated in those areas.

The local channel is the portion of a private line that connects an AT&T point of presence within a BOC's territory to a customer's premises. It is provided by the BOC, which charges AT&T for the use of its facilities.

AT&T in turn passes that charge

on to the private-line user.

According to a New York Telephone spokesman, his company is requesting the rate increase because its current special access rates are only netting the company a 3.08% rate of return. Under Federal Communications Commission regulations, New York Telephone is entitled to a 12.75% rate of return. A spokeswoman for New England Telephone said her company is realizing a 5.2% return on its special access investment.

Both BOC representatives said that the increases are expected to bring their companies' rates of return on investment close to the FCC-mandated limit. The increases will be in effect until Dec. 31, 1986. Prior to then, the two BOCs will file for additional increases in special access rates, which would go into effect Jan. 1, 1987.

The proposed July special access hike will mark the second time New York Telephone and New England Telephone have raised their special access rates since the original filings. Spokespeople for both companies said the increases are necessary because the companies have developed their rate structures with very little experience by which to judge cost of service.

► HUGHES AIRCRAFT CO.

New Intelsat VI satellite has onboard signaling

BY JIM BROWN
New Products Editor

EL SEGUNDO, Calif. — A prototype International Telecommunications Satellite Organization (Intelsat) satellite, which will reportedly allow incoming information streams to be switched among six downlink beams in milliseconds, was unveiled at the Hughes Aircraft Co. plant here last week.

Intelsat claims the 39-foot-tall Intelsat VI will be the first commercial satellite to use an on-board signalling technique called satellite-switched time-division multiple access (SS/TDMA). Twelve of the satellite's 48 transponders can use the switching method. Hughes Aircraft will build four additional such satellites for Intelsat.

Plans to launch the first Intelsat VI satellite have been delayed to mid-1988 after midair explosions earlier this year grounded both the U.S.'s space shuttle program and the French company Arianespace, Inc.'s Arian IV rocket (see "Costs ground Ford," page 5).

The SS/TDMA satellites will enable a transponder to send six downlink beams alternately every two milliseconds, creating a point-to-multipoint network. A transpon-

der typically receives signals from an earth station and relays them over a global beam or a spot beam. Global beams send signals to all earth receivers, which then search for only the information addressed to it. Spot beams are directed to smaller locations in a point-to-point manner.

Using SS/TDMA, earth stations compile and store digitized signals in the order they are to be relayed. That relay order is determined by the sequence in which downlink connections are made. The signals are beamed up to the satellite in burst mode at 120M bit/sec once every two milliseconds.

Satellite switching capability has been hinted at for some time, but has not been implemented, said Joaquin Gonzalez, program director of strategies in telecommunications for the Stamford, Conn.-based Gartner Group. He pointed out, however, that there is currently no way to get the satellite into orbit.

"The real tricks on the Intelsat VI are the SS/TDMA switch, the satellite's capability to cover additional geographic areas by means of zone beams and increased power," said John Phiel, a communications engineer at Intelsat.

See **Intelsat** page 6

Table of contents

TOP NEWS

Martin Marietta has banded together the seven RBOCs and Northern Telecom in a run for the golden ring, a \$4.5 billion government contract. **Page 1.**

Codex has lowered the entry level for network management with the introduction of the 4840. **Page 2.**

INDUSTRY UPDATE

Memotec Data has made known its bold plan to acquire Infinet, Inc. **Page 7.**

TELECOM TRENDS

StrataCom, Inc.'s unique packet-switching T-1 mux may be a harbinger of a technology that will prove to be the choice of networks that integrate voice, data and image. **Page 11.**

DATA DELIVERY

California is the place to be for

working on a telecommuter tan. **Page 9.**

FACTORY COMMUNICATIONS

A new on-line data base search service allows users to locate and exchange manufacturing-related information. **Page 15.**

COMMUNICATIONS MANAGER

A bachelor's degree in LAN technology offered by Oregon Institute of Technology may be the first of its kind. **Page 17.**

NEW PRODUCTS AND SERVICES

Univation, Inc. entered the PC-compatible, local net market with the introduction of its LANscape system. **Page 19.**

FEATURES

In a *Network World* exclusive, Northern Telecom CEO Edmund Fitzgerald praises divestiture. **Page 24.**

**Only One
Manufacturer
of T-1
Resource
Managers...**

Has more than 3,000 units installed worldwide.

Provides worldwide factory service.

Can design, install, and maintain
your entire network.

Can save you substantially more
money than any other supplier.

Has systems compatible with
all worldwide standards.

Timeplex[®]

Timeplex, Inc. Woodcliff Lake, NJ 07675 201-930-4600

► INTEGRATED INFORMATION NETWORK

Early users prepare for switch

*Sears, Eli Lilly and University of Illinois to implement IIN.***BY MARY PETROSKY**

West Coast Correspondent

The lure of substantial cost savings has encouraged three large Midwestern users to install an all-digital Centrex-like service developed by Ameritech and known as Integrated Information Network (IIN).

Eli Lilly & Co., Inc., Sears, Roebuck and Co. and the University of Illinois hope to slash costs and gain control of their networks.

The university is incorporating IIN in the overall revamping of its telecommunications system, which includes both voice and data capabilities.

"We were running out of capacity in voice," said Ed Otting, director of Information Systems Operations for Eli Lilly of the decision to adopt IIN. "This system will save us half a million dollars a year, based on the rate filings of the local telephone company."

Eli Lilly currently uses analog Centrex at its five campuses around metropolitan Indianapolis. The company is scheduled to cut over the service — which Otting refers to as his "digital Centrex" — in December.

Sears is also a Centrex user and will convert the 8,000 telephone lines in the company's headquarters in Chicago to IIN. The cutover is scheduled for the middle of 1987, according to a company spokesman. IIN will also serve as a network vehicle to connect a variety of other Chicago-based companies in the Sears family, such as Allstate and Coldwell Banker.

Sears was attracted to IIN because it offers comprehensive least-cost routing to long-haul carriers, including the ability to determine which carriers' network points of presence are closest to desired destinations.

Introduced by Illinois Bell, Indiana Bell and Wisconsin Bell beginning last fall, IIN is a central office-based service that uses a Northern Telecom, Inc. DMS-100 digital switch. Rather than integrating voice and data over one wire, IIN uses three pairs of wires — one pair for voice and two pairs for data, according to Dan Greenlee, IIN delivery manager for Indiana Bell. Data is transmitted at speeds up to 56K bit/sec.

Despite the fact that separate voice and data wires are being installed, data use requires the equiv-

alent of another phone number. Greenlee anticipates, however, that most users will typically have only one telephone number per station, so they will not be able to transmit voice and data simultaneously.

IIN was designed to give users more control over their network, according to a spokesman for Illinois Bell. A key feature, called Hot Spares, lets businesses reserve a given number of lines; when customers want to activate the lines, they can make the changes them-

See IIN page 35

► NET REDESIGN

Farm supply coop reaps cost-saving harvest

BY MICHAEL FAHEY

Staff Writer

KANSAS CITY, Mo. — An agricultural supply company based here hopes to chop \$73,000 per month from its private line bills by reconfiguring its network to take advantage of tariff options and by augmenting its leased-line network with very small aperture terminal satellite service.

Farmland Industries, Inc. is a farm supply cooperative with an 800-drop network serving 17 states, according to Jerry Younger, data communications manager of the company. Younger estimates he will save \$58,000 per month by exploiting tariff options and another \$15,000 per month by replacing some leased lines with Vsat links.

"AT&T's private line rates were going up 200% in our geographic area, while the local tariffs were not," Younger said. To exploit this

discrepancy, the company is reconfiguring its network to reduce the number of lines running between local access and transport areas. A Lata-pure configuration will enable Farmland to take advantage of intra-Lata private line rates, which can be lower than inter-Lata rates.

Younger cited the manner in which company network locations in Nebraska are supported as an example of the Lata-pure strategy. Farmland has roughly 100 locations in Nebraska scattered evenly through the state's three Latas. Each Lata is supported with a leased line that runs back to Farmland's headquarters here. Company locations within each Lata are supported with multidrop leased lines to take advantage of these low rates and then multiplexed back to Kansas City over the dedicated AT&T line.

Besides reducing network costs, See Farmland page 34

► TRANSMISSION SERVICES

US Sprint tariffs filed

*US Telecom, GTE Sprint deal bears fruit.***BY JOHN DIX**

Senior Editor

US Sprint Communications Corp., the company recently formed by the merger of GTE Sprint Communications Corp. and US Telecom, Inc., filed its first tariffs as a unified company with the Federal Communications Commission last Friday.

The revamped service line and new tariffs are, on average, 9% lower than former rates, although it is unclear whether the new rates were compared with GTE Sprint or US Telecom figures. In the best case, savings of up to 48% can be

realized with the new rates. In some instances, US Sprint's rates are 35% below AT&T's, US Sprint claimed. It reported its Wats rates will be 17% below AT&T's Wats rates and barely below comparable MCI tariffs.

Although the new service line borrows mostly from GTE Sprint, management of the voice side of the company has fallen squarely into the hands of Charles Skibo, former president of US Telecom.

Donald Prigmore, former president of GTE Sprint and one-time member of the management troika that made up US Sprint's office of the president, recently accepted a

reassignment elsewhere within GTE. J. David Hann, former president of GTE Telenet, is still a member of that team.

According to a company spokesman, services filed with the FCC will draw from GTE's bread-and-butter residential service, but promote the company's Wats offerings. US Telecom has apparently contributed the network facilities needed to make T-1 high-speed digital services generally available.

US Sprint hopes its new service mix and its drive to become the nation's first all-fiber-optic, long-distance carrier will entice new business customers. Corporate accounts are crucial to all AT&T competitors because of the 80/20 rule: 80% of a carrier's revenue can be generated by 20% of its corporate customer base. The US Sprint spokesman estimated that 80% to 85% of the company's 2.6 million

See US Sprint page 38

NETWORK WORLDBox 9171, 375 Cochituate Road
Framingham, Mass. 01701-9171
617/879-0700**Editor**

Bruce Hoard

Managing Editor

John Gallant

Features Editor

Steve Moore

Associate Editors

Kathleen M. Cahill

Lisa Guisbond

Senior Editors

John Dix

Paul Korzeniowski

Senior Writers

Margie Semilof

Bob Wallace

Staff Writers

Michael Fahey

Nadine Wandzilak

New Products Editor

Jim Brown

Washington, D.C. Correspondent

Karyl Scott

1273 National Press Building

529 14th Street NW

Washington, D.C. 20045

West Coast Correspondent

Mary Petrosky

1060 Marsh Road

Suite C-200

Menlo Park, CA 94025

Assistant Features Editors

Christine Casatelli

Robert Mitchell

Copy Editors

Josh Gonze

Nicolene Hengen

Beth Lazarus

Susan Tanona

Art Director

Dianne Gronberg

Informational Graphics Designer

Alan Hopkins

Assistant to the Editor

Cheryl Tynan

Publisher

F. Douglas DeCarlo

Administrative Assistant

to the Publisher

Mary Fanning

Production Director

Peter Holm

Production Manager

Marlene Stibal

Production Assistant

Stephen DeLacy

Pasteup Manager

Patricia Gaudette

Typesetting Manager

Carol Polack

Board Chairman

Patrick J. McGovern

President

W. Walter Boyd

Executive Vice President

Lee Vidmer

Senior VP-Communication Services

Jack Edmonston

Group VP-Circulation

Margaret Phelan

VP-Finance

William P. Murphy

Second-class postage paid at Framingham, MA, and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue the last two weeks in December by CW Communications/Inc., 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests.

Non-qualified subscribers: \$3.00 a copy; U.S. — \$65 a year; Canada, Central & South America — \$110 a year; Europe — \$165 a year, all other countries — \$245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin.

Four weeks notice is required for change of address. Please include mailing label appearing on front cover of the publication.

Network World can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106.

Network World is distributed free of charge in the U.S. and Canada only to qualified management or professionals who specify and maintain communications equipment and systems, including voice, data and video, as well as to common carriers, consultants, systems houses and manufacturers of communications equipment.

PHOTOCOPY RIGHTS: Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, Mass. 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

POSTMASTER: Send Change of Address to *Network World*, Box 1021, Southeastern, Pa. 19398-9979.

Copyright 1986 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in *Network World* is forbidden without written permission. Special requests for reprints and permissions only should be addressed to Nancy M. Shannon, CW Communications/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

"ABC membership applied for"



ABP

Martin Marietta from page 1

equipment manufacturer, and Bell Northern Research, its research and development arm in Canada, will provide network design, technical support, software development and a network control center that will be staffed by Martin Marietta.

The seven RBOCs will be responsible for arranging local communications services and local access to the national network.

A long-distance provider has not as yet been named, although observers say U.S. Sprint Communications Co., the newly formed joint venture of GTE Corp. and United Telecommunications, Inc., is a prime contender. Martin Marietta may, however, opt to team up with more than one long-distance carrier, said Stephen Copps, Martin Marietta's FTS program director.

Martin Marietta's two-year-old Information and Communications Systems Co. will handle the bidding process, Copps said.

The GSA is expected to issue its second request for proposal draft in August and the final request in November. The government agency plans to name a prime contractor in fiscal 1987, with the transition to the new network beginning in 1989.

Largest private net in world

FTS 2000 will be the largest private telecommunications network in the world. The present system, FTS 1000, has been in the hands of AT&T since its creation about 20 years ago. FTS 1000 is primarily an analog system used for voice communications. The network consists of 1,655 private branch exchanges and Centrex devices, which together carry 1.5 billion minutes of traffic per year.

The GSA wants the new network to be digital, in anticipation of increasing data transmission needs, such as support of electronic mail, videotex, compressed video and voice mail.

Although AT&T claims it earns approximately \$225 million annually from the FTS contract, analysts say the figure is considerably higher. AT&T has dedicated a vice-president, Louis Golm, solely to the FTS contract and is not likely to relinquish this huge account without a fight.

Opinions differ over how effective the team of Martin Marietta, Northern Telecom and the seven RBOCs will be in light of AT&T's long-standing track record in constructing and maintaining large networks.

"Let's face it," said George Delinger, a telecommunications analyst with Washington Analysis Corp. in Washington, D.C., "there's no one in the world that runs a long-distance network like AT&T."

"We're not talking about hooking up 200 telephones. We're talking millions of devices."

"The FTS contract is not like a Defense Department contract," said Daniel McFarland, principal engineer for telecommunications services at the consulting firm R.W. Beck in Washington, D.C. "The prime contractor for FTS will have

to deal with lots of government agencies, local exchange carriers and long-distance carriers. The expertise required will be immense, and I don't think Martin has ever done a telecommunications project like this."

However, Martin Marietta has already won at least one large federal government telecommunications contract. It is the prime contractor for the Federal Aviation Administration's \$13 billion program to upgrade the nation's air traffic control system.

That communications system involves the upgrade of a voice switching system, air-to-ground communications, remote microwave links and the National Airspace Interchange Data Network. **Z**

► SATELLITE TRANSPONDERS**Costs ground Ford****BY BOB WALLACE**

Senior Writer

WASHINGTON, D.C. — The failure of four satellite launch vehicles has resulted in skyrocketing insurance costs and forced Ford Aerospace Satellite Services Corp. (Fassc) to reexamine its plan to lease or sell satellite transponder capacity.

The Fassc decision to reassess its corporate strategy came in the wake of the July 21 announcement that the next space shuttle would

not be launched until 1988.

Fassc, which does not currently have any satellites in orbit, had reserved a spot on one of the National Aeronautics and Space Administration's (Nasa) space shuttle flights prior to the fatal explosion of the Challenger.

Alan Parker, chairman of Fassc, was vague about the company's future, reportedly saying only that these developments "could result in a phasedown or some kind of curtailment in three months or so."

See **Ford** page 34

THE WRONG TELEPHONE SYSTEM CAN STUNT YOUR GROWTH

The Right System: ITT 3100 Voice/Data PABX

If yours is a growing company, you need a telephone system with growth capability built right into it:

The ITT System 3100 Voice/Data PABX.

The entire system is modular. Which allows it to grow with remarkable cost efficiency. Now and in the future. You see, while you grow, you just keep adding on to your original equipment instead of replacing it.

Start small, grow big

You can start with as few as 20 telephone lines and grow up to 384. You can add on as little as one phone at a time or as many as you need.

The ITT System 3100 not only communicates voice, it can be programmed to communicate data from one work station to another, to computers, word processors, high



speed printers and electronic mail systems. So it's not only expandable in terms of telephones and lines, but it's also expandable in functions. And, it's all so remarkably easy to use.

It's for now and the future

Simply stated, it can easily handle the complex voice requirements you have now plus the rapidly developing data communications capability you're sure to need in the future.

What system in its category is equipped to do so much, so economically? More than 6,000 companies all across America have answered by buying the cost-efficient ITT System 3100. They all find it comforting to know too, that we have a national service organization they can call on should the need ever arise. And behind that, there's an R&D organization that's made ITT a world leader in telecommunications.

The only way to grow

Why take chances? Get the right system from the start: ITT System 3100.™

For more information, call toll-free: 1-800-922-0184, Operator #1.

Or write: ITT, Business & Consumer Communications Division, 6131 Falls of the Neuse Road, Dept. CC-6, Raleigh, NC 27609. In Canada, call: 1-519-821-2000.

ITT

► NETWORK MANAGEMENT

New DEC package keeps software house

Tool spells relief for Decnet managers.

BY PAUL KORZENIOWSKI
Senior Editor

LITTLETON, Mass. — Digital Equipment Corp. last week announced software designed to make the job of a Decnet network manager easier. Remote System Manager (RSM), a layered software package that runs on Decnet, represents a new type of network management tool, according to Steve Hargrove, network interconnection marketing manager at DEC.

Hargrove listed three types of Ethernet network management packages. The first manages the status of various connections. A second monitors the status of various nodes. RSM supplies tools that enable a network operator to per-

form various software housekeeping tasks. With the package, a network operator can install network software, supply software updates and make backup copies of files, a task previously required of users. "White-collar workers do not want to spend their time backing up files," Hargrove said.

RSM consists of two pieces of software. One piece runs on a centralized VAX system — any system from the MicroVAX II to the VAX 8800 — and controls many of the network management functions. This server can support as few as five or as many as 40 other network stations, which can be MicroVAX II or VAXstation II systems. Each of these remote stations must run a complementary piece of soft-

ware that works in conjunction with the central package.

With the software, a network manager can install software at a client's node and save it on an RSM server. From the server, the manager is then able to install the software at all other nodes so that everyone would be working with the same version of a package.

RSM also enables an operator to keep libraries of software required for various applications. Applications are stored in named sets on the server, which simplifies installation and updating of software on a client system. The network management software also supports central queuing and print services. In addition, an operator can distribute DEC VMS operating system-defined logical names for various files, data bases and peripherals. Users can access the resource by specifying the logical name; they do not have to know where the resource resides.

Prices for RSM server software range from \$1,500 to \$7,500. Client server software prices range from \$300 to \$900. □

► GTE RESEARCH

Technique thrusts T-1

BY KARYL SCOTT
Washington, D.C. Correspondent

WALTHAM, Mass. — GTE Laboratories, Inc. has developed a digital speech-encoding technique that, when combined with other compression techniques, may eventually enable T-1 digital communications facilities to support eight to 12 times the number of voice channels normally supported.

The speech sampling technique, called Adaptive Subbands Excited Transform (Aset), digitally encodes speech at 16K bit/sec, compared with industry standard 64K bit/sec Pulse Code Modulation (PCM) and the newer 32K bit/sec Adaptive Differential Pulse Code Modulation (ADPCM) techniques.

A 1.544M bit/sec digital T-1 link could support 96 voice channels encoded using the 16K bit/sec Aset algorithm, according to Joel Krugler, director of telecommunications at the company's research laboratory here.

Using a silence detection compression technique that fills gaps in speech with parts of other conversations, the 96-channel capacity could be increased by a factor of two or three, Krugler said. Presuming the best, the technology would enable a single T-1 link to support up to 288 voice channels, compared with the 24 PCM or 48 ADPCM channels per T-1 span that can be achieved today.

Aset provides better voice quality than ADPCM at half the bit rate, Krugler claimed.

"This 16K bit/sec voice is the best we've heard," Krugler said. Formal tests at the GTE Labs have had results that back Krugler's boast, showing Aset to be statistically better than ADPCM, he said.

The announcement by GTE Labs, the research subsidiary of GTE Corp., caps four years of research and development. GTE has applied for patents and said that a commercial product could be available within the year. The prototype device is currently undergoing beta tests.

Although it is uncertain what commercial products will come out of the technology, Krugler said GTE has developed a patented pipeline processor with a unique dual memory that implements Aset. He believes the company will exploit both technologies in a commercial product that would initially enable customers with T-1 networks to support 96 voice channels.

The company may also develop smaller units that would enable customers to multiplex a number of voice circuits over lower speed circuits, such as 56K bit/sec digital links, or apply the technology to telephone company networks.

Krugler said GTE plans to test the technology outside of the lab by end of year. □

► TRANSMISSION ALTERNATIVES

Vsat user saves \$140,000 per month

Financial Information Trust chooses Equatorial network.

BY BOB WALLACE
Senior Writer

DES MOINES, Iowa — Financial Information Trust (FIT), a data processing service bureau for savings and loan associations, plans to save roughly \$140,000 per month by replacing its 15-state, 100-leased-line network with an 800-location, two-way, very small aperture terminal network.

FIT last week inked an agreement valued at \$12 million with Equatorial Communications Co., which will operate and supply the equipment for the data network. The Equastar Satellite Transaction Network will tie an assortment of automated teller machines (ATM), on-line teller machines and platform terminals to FIT's DP center here.

Unlike several other users that have opted for Vsat nets to replace interstate private lines, FIT will use its satellite network to replace intrastate leased lines. These facilities make up 80% of the company's \$430,000 monthly communications bills.

Frank Paulus, senior vice-president of operations for FIT, said the company chose Equatorial to provide the satellite network because the vendor's C-band Vsats were roughly half as expensive as the Ku-band Vsats that other vendors offer.

Paulus added that the Vsat network would enable the company to control costs better than with its current leased-line network.

"We will be able to control our communications costs for the next three to five years with the Vsat network and be able to add sites to

the network at a fixed cost, while the cost of leased lines becomes more erratic," he claimed.

FIT opted to use Equatorial's hub station in Mountain View, Calif., instead of purchasing its own.

"We decided not to purchase a hub station because of the cost associated with such a purchase and because of the staff required to operate the facility," Paulus related.

Transaction information generated from the ATMs will be sent up to the satellite and beamed down to the hub station in Mountain View. The data will then travel over leased lines to FIT's DP center here. Paulus said 9.6K bit/sec leased lines will be used to link the hub station with the DP center.

Data sent from the DP center to remote locations will travel from the center over the leased lines to the hub station. The information is then transmitted to the satellite, which relays the data to each Vsat. Paulus claimed that each financial transaction will take fewer than five seconds to complete.

Paulus said one major disadvantage of installing a Vsat network is the amount of time it takes for the Federal Communications Commission to license each individual Vsat dish antenna. He claimed this period ranges from 30 to 60 days but noted that Equatorial will handle all Vsat licensing work.

One port on the Vsat will be used to handle Burroughs Corp.'s Poll-Select data protocol, while the second port will support IBM's Binary Synchronous Communications protocol. After FIT adds IBM 4700 financial terminals and IBM System/36s to selected locations, the Vsat

will handle IBM's Synchronous Data Link Control protocol. The bulk of the 800 locations are equipped with financial terminals produced by Burroughs, TRW, Inc. and Datapoint Corp.

Paulus suggested other users considering the purchase of a Vsat network should first fully define their company's data communications requirements.

"The user should examine its current communications as well as the company's requirements three-to-five years from now," he advised. □

Intelsat from page 2

Intelsat VI was designed with two global beams; four zone beams that cover large geographic areas typically the size of a continent; two hemispheric beams, one covering the East, the other covering the West; and two positionable spot beams in the Ku band. The satellite has 10 transponders that operate in the Ku band and 38 in the C band. Eight Ku-band transponders will be modified to increase their 8.5 watts of power to 20 watts. Two transponders will be upped to 40 watts.

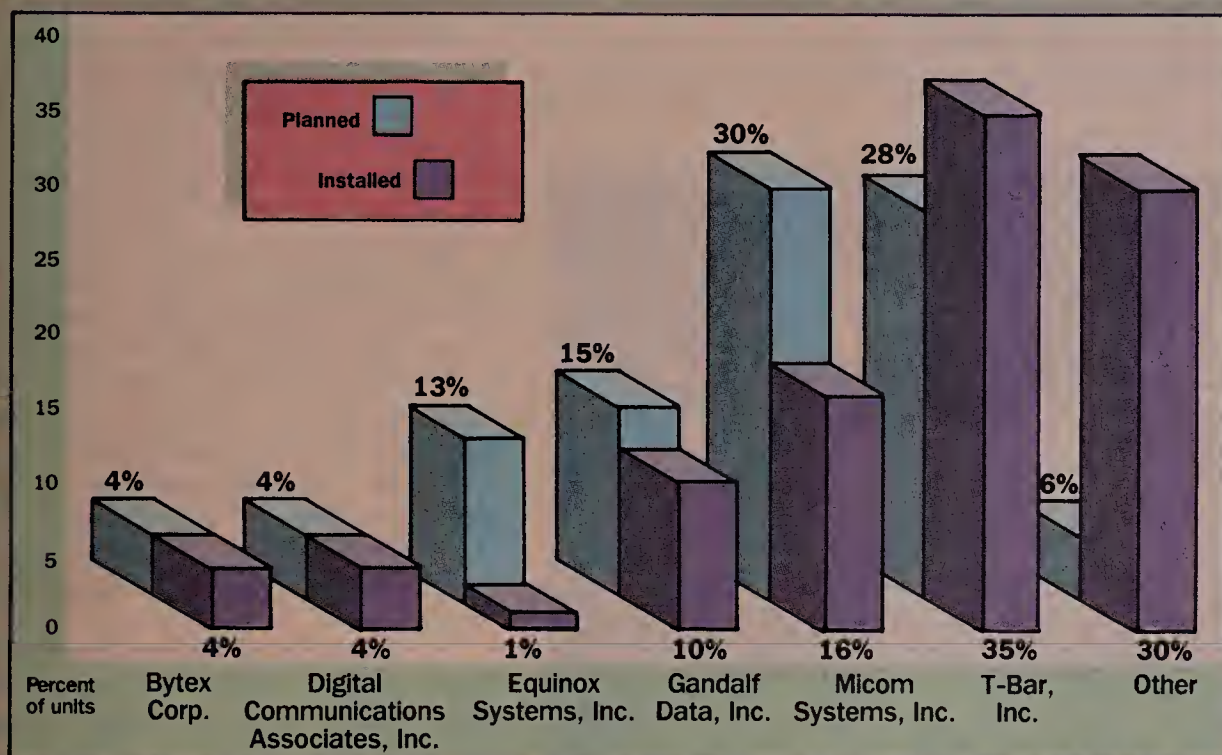
Intelsat VI is expected to remain operational for 14 years and will reportedly carry 120,000 simultaneous telephone calls and at least three television channels. By comparison, the 32-transponder Intelsat V-A — the most advanced satellite Intelsat now has in orbit — can handle 15,000 simultaneous telephone calls and two television channels. The Intelsat VI program, started in 1982, was designed to replace some of Intelsat's 16 orbiting satellites and add user capacity. □

INDUSTRY UPDATE

MCI option targets AT&T's Pro America

WASHINGTON, D.C. — MCI Communications Corp. last week announced MCI Prime Calling Option in an attempt to match AT&T Communications, Inc.'s Pro America reduced rate calling scheme. The yet-to-be-tariffed calling option targets users that spend more than \$200 per month for interstate long-distance service. MCI plans to begin offering the option Aug. 1. Users that pay the one-time \$10 subscription charge will receive a 10% discount on the carrier's long-distance services. The \$10 subscription fee will be waived for users that request the option between Aug. 1 and Dec. 1.

**Planned vs. installed market share
of data communications switches**
July 1986



SOURCE: COMPUTER INTELLIGENCE CORP., LA JOLLA, CALIF.

ACQUISITIONS

Memotec grows

PAD maker buys Infinet.

BY PAUL KORZENIOWSKI
Senior Editor

MONTREAL — Memotec Data, Inc. last week proposed acquiring Infinet, Inc., based in North Andover, Mass. The move will meld Memotec's packet-switching products with Infinet's network management offering.

Memotec's acquisition of Infinet, made possible by the strength of the Canadian-based company's balance sheet and the fact that Infinet carries some debt, would create a \$50-million company. Memotec's 1985 revenue was roughly \$17 million, and Infinet's was \$35 million.

Some merger details have yet to be ironed out, such as how Infinet's debts will be handled. Infinet shareholders also have to approve the sale by the middle of August. "There is a slight possibility that the shareholders could vote the deal down," said Nicholas A. Papantonis, president and chief executive officer at Infinet.

On the surface, the merger makes sense. First, the two companies' product lines complement each other and will enable the new company to offer network management systems that integrate control of X.25 packet networks and modem-based dial-up and leased-line networks.

And second, the merger combines Infinet's domestic presence with Memotec's strong international standing.

Infinet, founded in 1969, garnered 8% of the modem-based network management market in the U.S. last year, according to Pam Powers, senior industry analyst at International Data Corp., a Framingham, Mass., market research firm. Memotec has a significant presence in the international packet assembler/disassembler market with close to 38% of that market but has only 8% of the U.S. packet-switching market.

Teamed together, the new venture will have an international scope and possibly be able to get a leg up on other vendors that supply network management systems that control only one portion of a network.

The merger's inception

The merger stemmed from an OEM agreement Infinet had signed with Memotec earlier this year, according to Infinet's Papantonis. The company had decided to integrate its network management offerings with various pieces of communications equipment and was planning to sell complete systems to its users. In addition to the agreement with Memotec, the company has signed OEM agreements with Tesdata Systems Corp. and Spectrum Digital Corp. for performance measurement systems and T-1 multiplexers, respectively.

The acquisition of Memotec will not affect Infinet's plans to integrate these items with its network management system, according to Papantonis.

The first item to be integrated, the performance measurement system, should be completed by fall. When that work is done, the company will turn its attention to integrating Memotec's packet-switching devices with its network management system.

In addition to the creation of a broader product line, there are other benefits to the agreement. Infinet could, for example, service Memotec equipment installed in the U.S. and Canada, a job now provided by Honeywell, Inc. Infinet also has its own manufacturing facility, which

See Infinet page 8

INDUSTRY EYE

MARK DAVIES

Invasion of the T-1 multiplexers

It is no wonder that T-1 multiplexers are the fastest growing segment of the overall multiplexer market, with a compound growth rate expected to hover around 30% over the next five years.

Cost reductions alone have attracted large users. T-1 trunks, which have only been readily available to private users since 1982, transmit at a speed of 1.544M bit/sec. Users have been able to reduce the number of leased lines needed and have realized dramatic savings on the cost of transmission equipment itself.

Tariffs for T-1 services that are more attractive than those for other multiplexer services also come into play. Since AT&T is allowed to price T-1 services strategically, and since AT&T intends to enlarge its part in the T-1 market, these favorable rates are likely to continue into the future. For example, new 1986 rates include a tariff for T-3 (44.7M bit/sec) called T45 that makes 28 T-1 channels available for about the same cost as seven T-1s. Availability of T-1 trunks will continue to be plentiful as the Bell operating companies compete against bypass

technologies.

Improvements in the efficiency of network operations are the clincher in explaining why the T-1 segment of the multiplexer market is the fastest growing. As multiplexers have evolved from simple point-to-point devices to software-intelligent boxes capable of handling multiple T-1 trunks, users are gaining flexibility to manage and configure their private networks.

This is essential for users, such as major financial institutions and airlines, where reliable transmission and network uptime are critical business elements.

To date, however, T-1 multiplexers have had one major drawback — voice. To cost-justify T-1 links, the private network must transmit efficiently both voice and data, since voice traffic accounts for approximately 80% of all business transmissions. To minimize the link's cost, bandwidth must be efficiently utilized. At the same time, quality of transmission must be maintained.

In signing up for T-1, the user basically must choose between quality of transmission and efficiency.

While significant progress has been made in developing highly reliable and efficient data compression techniques, such as Trellis Coded Modulation, tech-

See T-1 page 8

Davies is vice-president for wide-area networking at Codex Corp. in Mansfield, Mass.

Infinet from page 7

may be converted to produce Memotec's U.S. products. "Companies value that 'Made in the U.S.' label," noted William M. McKenzie, Memotec president and chief executive officer.

Infinet, a privately held company, has been approached at least a dozen times concerning merger possibilities, according to Papantonis. The company felt that now was the time to merge. "Size is becoming a more important issue," he said. "Users are leery of buying from anyone but large companies."

Uncertainty concerning some of the details clouded the actual purchase price of Infinet. Earlier this month, Memotec completed a few rounds of private funding that left

the company with \$26 million in capital.

Ambitious acquisition program

At that time, the company said it would use the money for acquisitions. In the last few years, Memotec has embarked on an ambitious acquisition policy with Infinet representing the third purchase. Memotec earlier purchased two small systems integrators.

The acquisitions have paid off, as the company has been growing steadily. 1986 expected revenue, not including Infinet revenue, is slated at \$35 million. McKenzie listed systems integrator, data base manufacturing or communications companies as probable targets for future acquisitions. □

T-1 from page 7

nological breakthroughs have been slower in coming to the voice compression arena, where analog voice signals must first be converted to digital.

Most compression techniques have spawned from Pulse Code Modulation (PCM), which is the de facto industry standard for converting voice to digital. In use since the late 1960s, PCM produces a high-quality voice signal, but utilizes the full 64K bit/sec bandwidth. There is no compression involved.

Adaptive Differential Pulse Code Modulation (ADPCM) takes this concept further and compresses voice into 32K bit/sec, doubling the number of voice channels that can

be transmitted over the same T-1 link.

Providing a high level of voice quality, ADPCM is rapidly becoming an industry standard. Its drawback is in its ability to compress only to 32K bit/sec.

Continuously Variable Slope Delta (CVSD) modulation is an alternative that has been on the market for some time. Like ADPCM, it compresses to 32K bit/sec. However, this method is particularly susceptible to noise interference and, as a result, produces a poor-quality signal.

Advances are being made in voice compression. A newer technique that provides both high-quality voice transmission and significantly improved compression capability is Subband Coding (SBC). Using this technique, which is closely related to PCM, voice compression can be reliably provided at both 32K bit/sec and 2,400 bit/sec. Although SBC can compress to rates of 1,600 bit/sec, quality may drop below acceptable levels, depending on the network configuration or application. While there are no products that use SBC on the market today, it is likely that users will see SBC incorporated into T-1 products in the near future.

In addition to improvements in voice quality, users can expect the evolution toward increased intelligence in T-1 devices to continue.

Already on the market are the first T-1 nodal processors with sufficient intelligence to handle complex networking functions and provide network fault tolerance. These high-powered devices share many features with some intelligent multiplexers available today. By directly querying the network, they can spot link failures, reroute traffic on the best available path and restore connections in seconds. The ability to restore a connection quickly is critical for those applications that automatically take time out in the middle of a session if a loss in data occurs.

The basic appeal of T-1 nodal processors is the sheer volume they can accommodate — anywhere from 15 to more than 30 links between nodes. Since each node can support anywhere from 100 to 500 tail circuits, it is not difficult to explain the subsequent savings.

What is on the market today, however, is expensive. Given that the initial investment for these nodal processors runs into the six-figure range, it is not likely that many users can take advantage of the flexibility offered by T-1 nodal processors today. As more vendors enter this arena, prices can be expected to drop.

Good news is also on the horizon in the standards arena as both vendors and users push for an open architecture that will provide for standard digital interfaces.

Intelligent T-1 devices will continue to become more affordable. Not only will T-1 users of the future have the ability to manage their own backbone networks, they will be able to access and utilize effectively those services provided by public networks as well. □

SYNCmodem™ is your SNA or BSC Gateway

Features:

- PC/XT/AT bus compatible
- Auto-dial/auto-answer
- Tone or pulse dial
- Supports Bisync or SDLC links

3 Models:

- 201 (2400 baud)
- 212AT/201 (1200 and 2400 baud)
- 208 (4800 baud)

Description:

SYNCmodem is an IBM PC, XT or AT bus compatible interface card capable of operating as a synchronous modem or as a synchronous interface card.

SYNCmodem is ideal for remote PC-to-mainframe or PC-to-PC communications. It comes fully integrated with 3780Plus™, CLEO-3270 SNA or BSC, and CLEO-5250 SNA software packages.

3780Plus allows fast and efficient file transfers, over common phone lines, between your PC and any micro, mini, or mainframe that supports 2780/3780 Bisync protocol.

CLEO-3270 SNA or BSC and CLEO-5250 SNA allow your PC to emulate a remote 327x or 525x terminal device. All you need is a phone line.

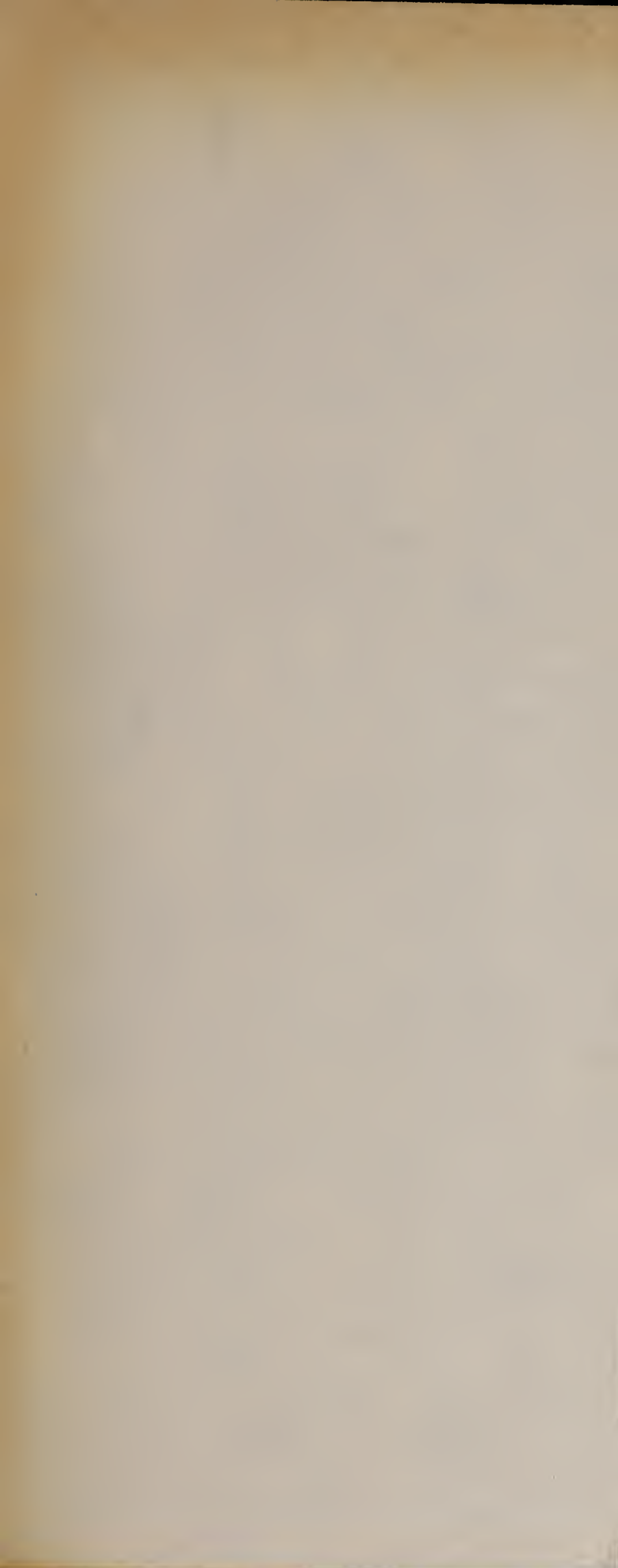
The 212/201 modem includes the Mirror asynchronous software package in addition to your selected CLEO SNA or BSC package.

For details call 1(800)233-CLEO. In Illinois 1(815)397-8110.

CLEO

CLEO Software
a division of Phone 1, Inc.
1639 North Alpine Road
Rockford, IL 61107
TELEX 703639

CLEO is a registered trademark of CLEO Software.
SYNCmodem and 3780Plus are trademarks of CLEO Software.



DATA DELIVERY

“In the next few years, there will be a tremendous amount of consolidation in the T-1 multiplexer market. Companies with \$100 million to \$200 million in revenue are going to be squeezed by increased competition and higher research and development costs. Most will be looking to enter marketing agreements with larger companies like IBM, AT&T and Northern Telecom, Inc.

Timothy Zerbic
vice-president of technology
Vertical Systems, Inc.
Dedham, Mass.

► TELECOMMUTING

California is leading state in telecommuters

NEW YORK — If you want to leave the office behind and work at home, maybe you should consider moving to California.

Electronic Services Unlimited, a market research firm here, published a report stating that California is the leading work-at-home state.

The state supports close to 13%, 1.7 million, of the nation's telecommuters, according to the firm's National Work-At-Home survey. More than 400 telecommuters answered the survey.

California telecommuters are doing quite well financially, with one-fifth of them enjoying an annual income of more than \$70,000.

Californians also own more personal computers and copiers than non-Californian home workers, according to the survey.

California home workers use the telephone more frequently, conduct more long-distance telephone calls, tend to use phones with more features and require twice as many telephone lines as non-Californian home workers. The result is a telephone bill \$10 to \$50 higher than the average home worker.

The complaint Californian home workers make most often is that they work too many hours.

Electronic Services Unlimited, 142 W. 24th St., New York, N.Y. 10011 (212) 206-8272. □

► CELLULAR TELEPHONES

Hot line on the move

Mobile phones and data terminals provide on-site info in emergencies.

BY MARY PETROSKY
West Coast Correspondent

BIRMINGHAM, Ala. — The Birmingham-Jefferson County Emergency Operations Management Agency here is hoping that quick access to information on toxic substances — provided via mobile cellular telephone and a portable data terminal — could help save lives in the event of a chemical spill.

The agency has just completed testing of a data retrieval system based on cellular telephone technology. “We obtained the cellular phones for field communication during emergencies and disasters,” said Wayne Randle, Civil Defense officer in charge of field emergency operations. One of the agency's main tasks is to help in the cleanup of chemical spills. Already this year, the agency has been involved in cleaning up 54 such spills, double the total for all of 1985.

“The chemicals are getting more exotic,” Randle said. “It's really a problem. We needed a system whereby we could identify the substance and find the proper containment procedure for that chemical. When you talk about hazardous chemical containment, you're talking about a whole new ballpark.” He noted that a recent report from the federal government indicated that the nation, as a whole, is ill-equipped to handle chemical hazards.

Although there are many published guides with information on toxic substances, none are complete, Randle said. To date, if emergency workers encountered a substance not listed in one of their guides, they called an 800 number provided by the Chemical Manufacturer's Association in Washington, D.C. This service, known as Chemtrec, doesn't always provide complete information, according to Randle. In addition, the information is given orally over the phone and has been subject to misinterpretation as it was repeated to participants in the cleanup operation.

“There are so many chemicals, we needed current, hard-copy information,” Randle said. A sheet with the data printed on it, he explained, could be handed to the fire fighters and clearly interpreted. After some investigation, Randle's group put together three pieces to make up their system: an on-line data base of information on chemicals, called the Oil and Hazardous Materials Technical Assistance Data System (Ohmtads), designed by Information Consultants, Inc. in Washington, D.C. and used by the Environmental Protection Agency; cellular telephones from BellSouth Mobility of Atlanta; and a data terminal from Houston-based Texas Instruments, Inc. called the Travelmate 1200, with a built-in thermal printer and a 1,200 bit/sec modem.

When responding to a hazardous spill, Randle's group can use the cellular phone to dial into the Ohmtads data base in Washington, D.C. The cellular See **Chemical** page 10

DATA DIALOGUE MARY PETROSKY

Quest for ideal link continues

Corporations are using an average of three methods to link personal computers with larger systems. Currently, the most popular method is the microcomputer-to-mainframe link (see chart below). However, many industry watchers say they believe this type of connection is a short-term solution that costs big bucks and creates big headaches without truly solving the integration

problem.

MIS managers opt for the micro-to-mainframe route simply because it represents a technology they know. One industry consultant points out that many mainframe systems developers don't have experience with distributed processing.

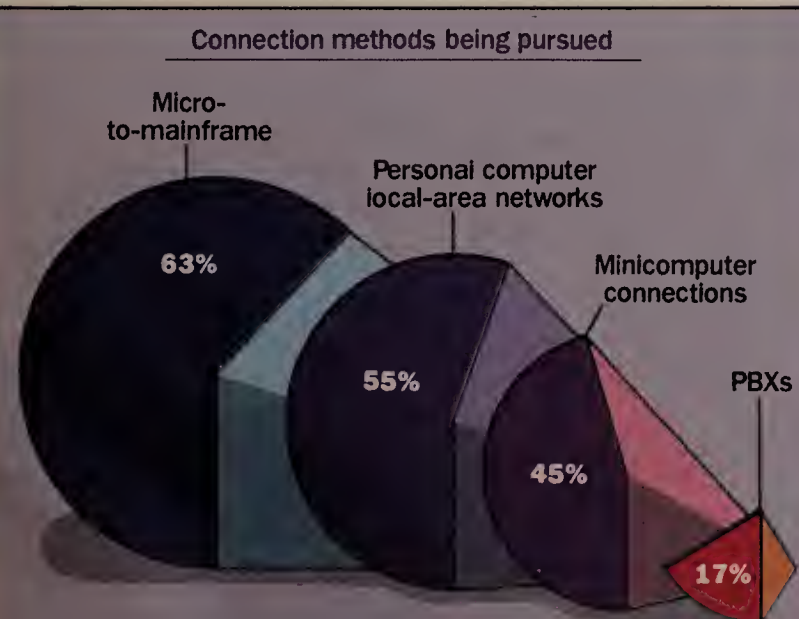
Lack of expertise with alternative integration schemes — such as the use of departmental systems

and local-area networks — fosters a tendency to go with what is tried and true.

However, at \$10,995 per micro connection, the micro-to-mainframe link is the most expensive and least functional integration method, according to Forrester Research, Inc. of Cambridge, Mass. Other integration methods Forrester priced were local-area networks, at \$9,100 per micro, and departmental systems, at \$10,590 per connection. Forrester Research Manager John McCarthy maintains that local-area networks and minicomputers offer more power and are easier to use than micro-to-mainframe links.

The \$10,995 figure for a micro connection assumes a company has 32 micros to be connected to a remote mainframe. Costs include office automation, data base and word processing software for the mainframe; virtual disk software; modems; terminal emulation cards for all the micros; two controllers; and two leased lines, estimated at \$1,000 per month. Also included are training, estimated at 50% of the costs of the micros; administration, 20% of micro connections. See **McMain** page 10

What are the most popular methods of integrating microcomputers?



Fortune 1,000 companies are using an average of three methods to integrate microcomputers, with micro-to-mainframe links the most popular selection.

SOURCE: FORRESTER RESEARCH, INC., CAMBRIDGE, MASS.

Chemical from page 9

phone is connected to the Travelmate via an RJ-11 adapter, which simulates all the features of a standard telephone. An emergency worker then uses the terminal to key in the request for data on a specific chemical. The information is transmitted back to the Travelmate and automatically printed out.

The system was on the drawing board for several months, Randle said. Slight modifications had to be made to the Travelmate's built-in modem so it wouldn't disconnect during temporary signal loss, which is typical in cellular telephone transmission. As a signal is handed off from one cell site to another, there is a delay of 200 milliseconds, according to Sharie Moore,

manager of data services for Bell-South Mobility. The Texas Instruments modem was modified to maintain a connection for up to 700 milliseconds and so that it wouldn't display or print garbage that results from bursts of data generated during hand-off. Randle's group has run several batteries of tests and is satisfied with the system's performance.

He envisions the agency's system as one of a number of such systems to be used by agencies responding to emergencies. "Data and computer technology have been in cars a long time," Randle said, pointing to the police force's use of this technology. "It's going to save some time, and probably going to save some lives." ■

McMain from page 9

cro hardware costs; and maintenance, estimated at 12% of the cost of hardware required for integration. To calculate additional load on the mainframe, Forrester estimates that 40 micros add one million instructions per second of processing overhead to each mainframe.

Even if these costs seem unreasonably high, there are other issues to consider, such as performance. A single ad hoc query from a micro user could result in the search of an entire data base. Users agree that micros doing standard interactive terminal emulation aren't a problem. The problem is large file transfers. These can bring a controller to its knees. As personal computer ap-

plications evolve, particularly data base applications, micro users are going to want to pipe more data over the communications system.

Security is the aspect of micro-to-mainframe links that causes the most concern. The consensus is that end users cannot be let loose on production data with a query tool. Current options for securing mainframe data include using pre-programmed inquiries and having programmers write extract programs that pull specific files and reformat them for micro users. The independent micro user, who probably bought his IBM Personal Computer-compatible to get out from under MIS control in the first place, will likely find both of these scenarios limiting. MIS managers, many with already overworked staffs, would probably not be thrilled with these solutions either.

Another alternative is to give users access to a subset of the data base. This means setting up an entirely separate mainframe system with its own data base. This may be the way to go for a number of reasons, says Arthur Andersen & Co.'s Rick Stuckey, partner in charge of minicomputer and microcomputer technical support. He points out that production data bases are generally designed for high-transaction traffic, using few paths. Not only are these data bases inadequate at handling ad hoc queries, they're difficult for users to navigate.

Setting up a second mainframe will keep the production system from getting bogged down. In addition, giving micro users access to a different data base — one designed specifically to handle their queries — means less end-user support, Stuckey says.

Given the costs and concerns surrounding micro-to-mainframe links, companies might consider moving away from the mainframe entirely. One school of thought advocates using a departmental system, perhaps in conjunction with a local-area network, to integrate micros. Forrester's McCarthy favors this approach because minis offer data bases and office automation software that are easier to use than mainframes.

Another possible solution attacks the problem from the other side: Move away from using micros. Use terminals to do distributed processing, proposes Tom Samson, partner in charge of Arthur Young's Technology Center in Dallas. Although there is a shift toward giving people more computing power, this doesn't necessarily mean pushing a lot of computing power down to the desktop, Samson says. He expects a new class of intelligent workstations to emerge to fill the gap between micros and dumb terminals.

Making the transition from a stand-alone micro environment to an integrated one is a big challenge. Although the micro-to-mainframe connection is a ready solution, it might be better for users to tread water and gain experience with other integration methods than to put up links that will only be pulled down later. ■

WILL YOU CHOOSE THE WIDE-AREA NETWORK YOU CAN RELY ON TIME AFTER TIME?

If the private wide-area network you select isn't reliable, it isn't anything. That's why it's comforting to know that ever since BBN Communications built the first wide-area packet-switching network in 1969, our systems have delivered an enviable record of availability — on the average, 99.99%.

The reason is simple. BBN networks are fail-safe. If a telecommunications line goes down, our packet switches automatically find an alternate route, and the change is completely transparent to the user.

What's not transparent is the Network Operations Center. Here you can monitor the quality of service using on-line reports and diagnose and isolate failures using built-in tools.

Both our alternative routing approach and our Network Operations Center are unique strengths of BBN Communications. Together they represent a commitment to reliability that convinced major corporations like MasterCard and Wang to choose BBN as their private wide-area network company.

It may well be the reason you should, too.

SHOULDN'T YOU BE TALKING TO BBN?

BBN Communications

A Subsidiary of Bolt Beranek and Newman Inc.

70 Fawcett Street, Cambridge, MA 02238
Telephone 617-497-3268 Telex 921470



TELECOM TRENDS

Audiotex: An 8-letter word for hype?

The Carina Group, a Los Angeles-based audiotex services company, will provide answers to the *Los Angeles Times*' Sunday crossword puzzle anytime after midnight Saturday. The service is available to residents in the 213 and 818 area codes. The number to dial is 976-5100. The company warns that its answers may not be the same as those published in the newspaper. The Carina Group's raison d'être is to "use the very latest in computer technology to offer interactive audiotex information services," which is also known as recorded information. Who says audiotex is a solution in search of a problem?

► T-1 SERVICE

Is the future in packets?

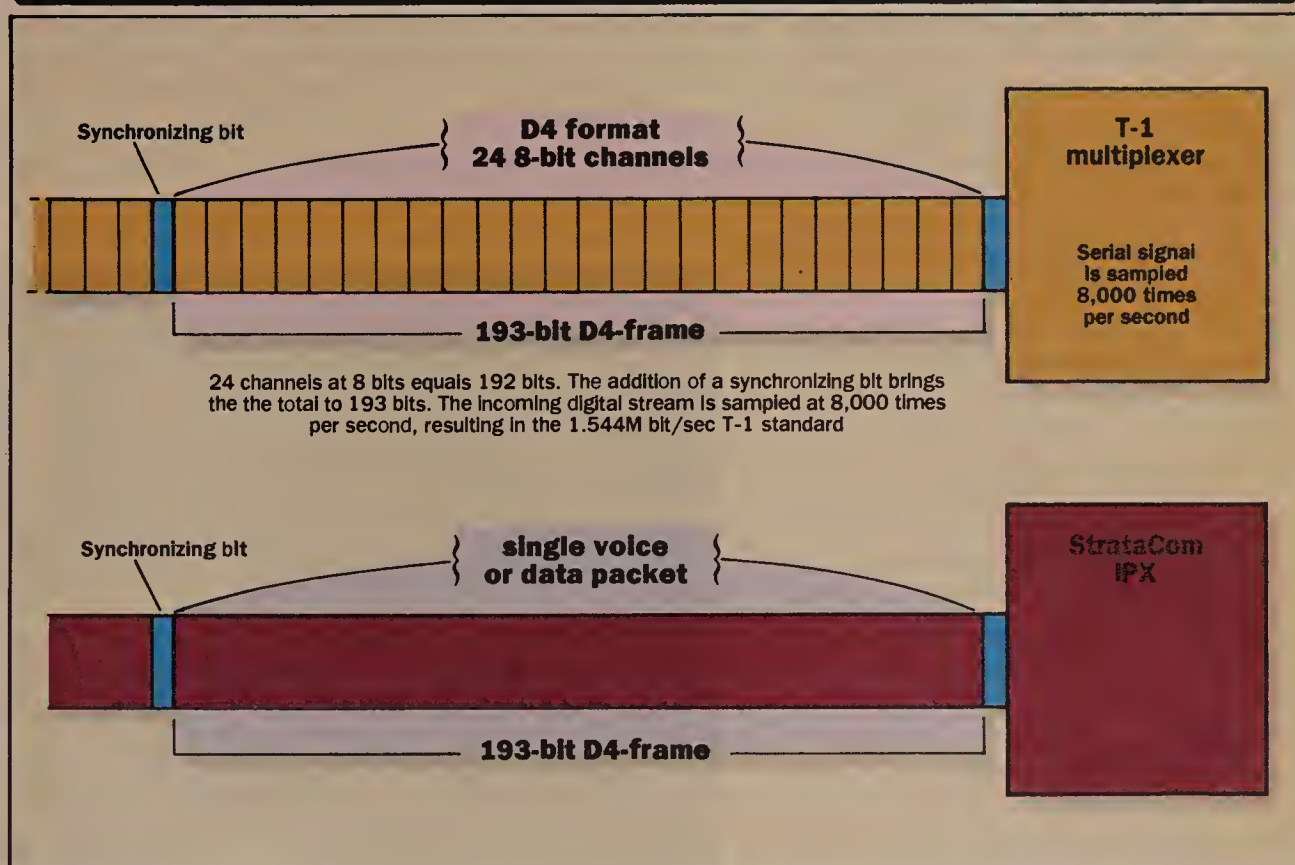
BY JOHN DIX
Senior Editor

Although StrataCom, Inc.'s recently announced T-1 multiplexer is unique among commercially available products because it transmits voice in packets, packet switching may eventually prove to be the technology of choice for networks that integrate voice, data and image.

AT&T Bell Laboratories just completed a year-long experiment with wideband packet technology in San Francisco. The company expects the technology to play a role in Integrated Services Digital Networks and later in a far-reaching concept it calls Universal Information Services.

As envisioned and implemented experimentally today, ISDN services targeted at large business customers use T-1 1.544M bit/sec multiplexed digital facilities that provide the equivalent of 24 circuit-switched channels. StrataCom See **StrataCom** page 12

Standard T-1 multiplexing compared to StrataCom, Inc.'s packet version



CROSS TALK

JOHN DIX

The AT&T contract squabble is heating up

AT&T's contract termination charges are still causing a stir among users that want to replace AT&T communications equipment before the lease term is up.

But they're afraid to talk about it.

No one wants to risk being made into a scapegoat, called to the stand in what AT&T's pin-striped legal legions would try to turn into a favorable and precedent-setting court decision.

The long-standing brouhaha over termination charges was fired up recently over just such an incident. AT&T won a court decision against a consulting company that prohibited the firm from recommending that its clients with AT&T equipment ignore termination charges ("Users girding for AT&T lease fight," *Network World*, July 14).

From AT&T's position, the issue is cut-and-dried. A contract is a contract. If you didn't want to abide by the rules therein, you shouldn't have signed in the first place.

Customers, however, sing a

different tune.

The company has changed since the contract was signed, they say. Creation of AT&T Information Systems nullified contracts signed with the old AT&T.

The courts and the Federal Communications Commission have sided with AT&T. So far. It appears that the only thing established in court to date is that customers should not try to interfere with contracts. The actual legality of the termination charges has not, apparently, been tested in court.

If some brave soul is willing to challenge the charges at the highest level, it seems that two significant points would have to be addressed.

The first: What are the legal and ethical ramifications of imposing strict termination charges on customers that want to replace AT&T equipment with switches from other vendors, and waiving or substantially reducing those fees for users installing new AT&T equipment?

And the second: Are AT&T's See **Termination** page 13

► CARRIER SELECTION

Users opt for quality

BY JOHN DIX
Senior Editor

RICHARDSON, Texas — While price plays a major role in carrier selection, actual service demand is affected by application, not cost, according to a study by the market research division of Spectrum Planning, Inc., an engineering and consulting company based here.

Spectrum's study, *The Technology Race for Long-Haul Telecommunications*, found that, among other things, demand for toll services is typically not a function of price.

More than 75% of 600 randomly

selected companies contacted in telephone interviews indicated that demand for toll service would not increase even if toll rates declined 20%. Two-thirds of the respondents said service demand would not increase if toll rates were slashed 40%. Others thought usage would increase roughly 9% if rates dropped that precipitously.

One of the conclusions the company drew from its findings was that reliability is more important than cost criteria. According to the report, "We believe that users are willing to pay for guaranteed high quality in their service rather than

See **Long-haul** page 13

► WILTRON CO.

Net tester tool out

BY MARY PETROSKY
West Coast Correspondent

MORGAN HILL, Calif. — A network test device that can be accessed remotely using a standard push-button phone and can read test results to the customer with synthesized speech was recently announced here by Wiltron Co.

The Model 9980 Maintenance Isolator provides basic testing of voice-grade telephone circuits and

limited data testing, according to a consultant who did a preliminary evaluation of the device.

Test any end-to-end copper circuit

The unit was designed for transmission testing, said Paul Marshall, design engineer at Wiltron, but can also be used to test any end-to-end copper circuits. This excludes circuits that employ repeaters, Marshall said.

See **Net testing** page 13

StrataCom from page 11

and AT&T propose retaining the standard T-1 framing transmission specification but doing away with circuit switching in favor of packet switching.

Packet switching offers many advantages over circuit switching but has traditionally been too slow to accommodate voice adequately. StrataCom overcame this hurdle by increasing the packet throughput of its box to 160,000 packets per second. The company also gives priority to voice packets because they are less tolerant of delay than data packets. Speech degrades with packet delay; computers just slow down.

Having overcome the problem of delay, the full benefits of packet switching can be applied to networks that integrate voice, data and other information.

"The primary benefit of the wideband packet approach is that it enables you to direct bandwidth on demand," explained Gus Zimmerman, supervisor of the Bell Laboratories switching prototypes group in Naperville, Ill. Packet technology makes it possible to use a small portion of a T-1's 1.544M bit/sec bandwidth one moment, and in the next instant dedicate the entire T-1 bandwidth to another application.

Efficiency is one of the other key attributes packet switching has over circuit switching. With circuit switching, the connection is maintained for the duration of a session, as with plain old telephone service. The way StrataCom and AT&T implement packet technology, packets are only sent when there is information to be transmitted. This means voice and data packets can be statistically multiplexed to increase the capacity of a fixed band-

width T-1 link.

For example, a voice conversation on a T-1 span multiplexed using conventional technology will be supported on a dedicated 32K or 64K bit/sec channel, depending on the modulation technology used. Because the link is dedicated, capacity is wasted when information is not being sent. If a caller put down the phone, the dedicated channel would go empty.

Because packet technology enables packets from different sources to be interspersed, the bandwidth is used more efficiently. If a caller in one conversation put his phone down, the dead airspace would be filled with packets from other voice or data conversations.

Statistically multiplexing pack-

ets enables StrataCom to double the number of voice conversations on a T-1 span, from the normal 24 to 48. Using 32K bit/sec Adaptive Differential Pulse Code Modulation (ADPCM) instead of 64K bit/sec Pulse Code Modulation provides another two-to-one compression, giving a total of 96 voice channels on a single T-1 link.

Zimmerman said AT&T's wideband packet technology, which also uses ADPCM, will support 120 voice channels on a T-1. "We encode speech in a special way so that when the network becomes congested we can drop off speech packets and lose only a small amount of fidelity," Zimmerman said. "The alternative is to block the traffic."

Like StrataCom, AT&T gives data packets a lower time priority than voice packets to maintain fidelity, but will never knowingly drop data packets.

AT&T's wideband packet technology is, according to Zimmerman, a follow-up to ISDN. The technology can support ISDN capabilities, "but offers up new opportunities because of the ability to do statistical multiplexing," he said.

Those capabilities will be realized with the arrival of AT&T's Universal Information Services. "The vision is to be able to connect anyone to anywhere at any time with cost-effectiveness and efficiency," Zimmerman said. "ISDN is a step along that path, as is wideband packet technology." □

Finally,
a data concentrator
so unique
you'll want to keep
the box
it comes in.



BOC BRIEFS

Pacific Bell and Nevada Bell will purchase transmission equipment from Northern Telecom, Inc. The two Bell operating companies have agreed to purchase DMS-1 Rural and DMMS-1 Urban Digital Subscriber Carrier Systems and fiber multiplex terminals.

▼
Bell Atlantic Network Services, Inc. announced last week that it has reached an agreement with Siemens Communications Systems, Inc. to purchase a 10,000-line Siemens EWSD central office host switch and three remote switching units. The systems will be installed in Moundsville, W. Va.

▼
Illinois Bell announced recently that Novalink, the company's high-speed, high-capacity fiber-optic service, will be available to nearly all of downtown Chicago later this month. The \$1.1 million project triples the area served by Novalink.

▼
BellSouth Systems Technology, Inc. will provide an advanced multitenant telecommunications system to Boston's World Trade Center. The Atlanta-based BellSouth subsidiary also will supply on-site maintenance and system design. □

Net testing from page 11

To operate the device, a user accesses the Maintenance Isolator at the testing site and keys in commands using a push-button telephone. Commands are typically three digits long. The device then responds with voice messages.

Test functions include: send tone, measure level, measure far-to-near noise, circuit monitor, dial tone monitor, loop-back and transfer to standby circuit.

Access Modules enable remote units to initiate tests in the direction of the telephone company or toward the end user's network. It can test up to 24 two-wire or 12 four-wire circuits. Each Maintenance Isolator can accommodate eight Access Modules. The device

also works with previously installed test equipment, Marshall said.

"The Maintenance Isolator basically operates as specified," said George Cisler, co-president in charge of engineering at the Los Angeles-based Communications Management Services, Inc.

"It looks like a good little machine for the price. However, it does need a few minor changes," he added.

One deficiency of the system is that it cannot be operated via computer, Cisler said. Another drawback is that the device cannot detect a busy signal, which could lead to the disconnection of an ongoing telephone conversation during testing. **□**

Long-haul from page 11

gain discounts on their current arrangements."

Interestingly, users said they anticipate voice requirements to define network needs through the rest of the decade. Most companies reported that voice still accounted for 90% to 95% of their network traffic, while data made up 5% to 10%. The traffic mix at companies with more than 20 locations, however, averaged 85% voice and 15% data. These users said they do not anticipate the traffic mix to change much through 1987. They also said a small portion of their future traffic would be allocated to video in the future.

The greatest growth in demand for telecommunications services,

the respondents agreed, was voice conferencing. More than 61% of the users contacted said they expect voice conferencing to have the greatest effect on future service demand. Other applications cited as factors likely to increase the demand for network services included high-speed data transmission, mentioned by 24% of the respondents, and electronic mail, mentioned by more than 11%.

In a second part of the study, the company drew conclusions about future long-haul technologies from a panel of 26 experts that included technologists, regulators, analysts and leading-edge users.

The panelists were asked to rate the performance of three long-haul transmission media: fiber optics, satellite and terrestrial microwave.

Fiber came out on top of this study segment, followed by satellite and then microwave. Fiber was not as highly favored over satellite

Here's the box.

A quick look at the MICOM™ BOX will tell you this is no ordinary data concentrator. In fact, the MICOM BOX Type 2 is the most flexible to configure and easiest to install data concentrator on the market.

It couldn't be easier to respond to new applications or to tariff changes. With six FEATUREPAK cartridges to choose from you can make the MICOM BOX function as a point-to-point async stat mux, a multipoint mux, or even a multiplexing X.25 async PAD. Simply select the desired FEATUREPAK™ firmware cartridge and plug it in.

EXPANSION'S A SNAP.

Inside the MICOM BOX you'll discover a microprocessor "engine" plus a modular system of circuit boards. And in minutes, you can expand the number of channels from 4, to 10, to 16. Add modems with automatic dial back-up. Or switch to digital service with an integrated DSU/CSU. All by just snapping in another board.

The user, not the factory, determines system parameters—such as flow control, data rate, and special host support. So you get greater flexibility, performance, and ease of installation.

THERE'S SOMETHING IN IT FOR EVERYONE.

It's inexpensive to expand the number of channels or add modems. Field service calls won't slow you down. Non-technical personnel can install MICOM BOX upgrades using nothing

more sophisticated than a screwdriver.

Network managers can configure, monitor, and test the entire network from any async terminal anywhere on the system using our unique Command Facility software. In fact, our menus are so clear-cut that even first-time users can do it.

Finally, corporate executives, using simple arithmetic, can quickly prove that the MICOM BOX is the single most economical solution to increasing network performance and reducing telephone line costs.

THE MICOM BOX MAKES OBSOLESCENCE OBSOLETE.

The MICOM BOX Architecture is all you'll need to graduate from small, point-to-point, leased-line networks to a variety of cost-saving multipoint configurations.

Our integral modems are soft-controlled by the multiplexor itself. Auto dial back-up for failed leased lines is transparent. And data rates of up to 9600 bps are available.

And because it's fully compatible with your presently-installed MICOM Micro800 concentrators and X.25 access equipment, your financial investment is protected, too.

Quite simply, the MICOM BOX provides the low cost, open-ended answer to accommodating new

applications and emerging networking standards. So there's never a risk of obsolescence.

CONCENTRATE. IT'S CHEAPER.

Data concentration is fundamental

to your networking success. But now the rules are changing.

You must deal with deregulated and continually changing tariffs. A growing number of transmission technologies. The demands of desktop computers and distributed databases. And adapting to the various protocols of major vendors like DEC, DG, Prime, Tandem and HP.

That's why we developed the MICOM BOX. To bring together everything we've learned about making data communications less costly, easier to manage, and more adaptable to change. We've simplified every aspect of installation, daily usage, network expansion and troubleshooting.

As a result, one MICOM BOX and a handful of our FEATUREPAK cartridges are all you need to tackle a range of applications that would have previously required as many as 55 separate models. It's a system that changes as your company's needs change. Efficiently and economically.

That's what you'd expect from MICOM, the world leader in low-cost, multifunction stat muxes. Our experience makes us the only real choice for datacomm professionals who demand the best products and support.

The MICOM BOX. How did we ever pack so much into it? To find out, just call us at 1-800-MICOM-U.S. for a free 16-page brochure that details the reasons why the MICOM BOX is the data concentration solution you've been looking for.

“Voice still accounted for 90% to 95% of network traffic.”

services as the researchers expected. Spectrum had thought fiber optics would rate higher than satellite because of fiber's inherent benefits in two critical areas — reliability and capital cost.

"Satellite showed very favorable ratings on flexibility and on service criteria," according to the study. "Second, satellite scores high on [the] question of availability, a particularly important finding in an environment colored by stories of long lead times in the implementation of private lines. Third, satellite media have a tremendous edge over fiber in point-to-multipoint applications."

Spectrum Planning is located at 251 West Renner Road, P.O. Box 831360, Richardson, Texas 75083-1360. **□**

Termination from page 11

termination charges fair in light of the fact that they were created in a monopolistic environment? When AT&T was the only game in town, steep termination charges were of little consequence because customers usually went back to AT&T.

While it is hard to fault AT&T's logic that a contract is a contract, it is true that the termination charges give AT&T a leg up when marketing to existing accounts.

Subtleties swing deals

On the other hand, running roughshod over users does little for the company's image. The threat of a legal suit may encourage customers to wait out a contract and spoil AT&T's chances of doing future business with that company. Subtleties swing big deals. **□**



MICOM Systems, Inc., 4100 Los Angeles Avenue, P.O. BOX 8100, Simi Valley, CA 93062-8100. 1-800-MICOM-U.S.
MICOM is a registered trademark and FEATUREPAK is a trademark of MICOM Systems, Inc.

Network World.

“... it's targeted to the people who count —
our customers and prospects.”

David Hunter, Director of Communications, Avant-Garde Computing, Inc.

Because Networks
Must Be Managed



May 23, 1986

Avant-Garde Computing, Inc.
8000 Commerce Parkway
Mt Laurel NJ 08054-2227

FWX 710-940-1569
Telephone 609-778-7000

F. Douglas DeCarlo
Publisher
Network World
CW Communications/Inc.
PO Box 9171
Framingham MA 01701-9171

Dear Doug:

A short story I thought you would like to hear:

An advertising rep for one of the more established trade journals nabbed me at a recent trade show and demanded to know why we had decided to advertise in Network World.

"It's unproven," he said. "It's redundant," he said. "It's risky," he said.

"Perhaps," I replied. "But it's also informed. Pithy. Timely. Attractive. And more importantly, it's targeted to the people who count -- our customers and prospects. We're going to give it a go."

"See you," he said.

"Yes," I replied. "In Network World."

A handwritten signature in dark ink, appearing to read "Hunter".

David Hunter
Director of Communications

Network World Sales Representatives

BOSTON
Maureen Sebastian
(617) 879-0700

WASHINGTON, DC
Gordon DuChes
(301) 921-9085

ATLANTA
Tom Tolbert
(404) 394-0758

NEW YORK
Eleanor Angone
Joseph Viviani
(201) 967-1350

SAN FRANCISCO
Chris Clyne
(415) 328-4602

LOS ANGELES
David Beardslee
(714) 545-7278

CHICAGO
Fran Jonikaitis
(312) 827-4433

NETWORK WORLD

The Weekly for Leading Users of Communications Products & Services



375 Cochituate Road, Box 9171, Framingham, MA 01701-9171.

FACTORY COMMUNICATIONS

► MANUFACTURING

ITI wires users into factory resources

BY BOB WALLACE
Senior Writer

ANN ARBOR, Mich. — Industrial Technology, Inc. (ITI), an independent company that evaluates and tests manufacturing equipment, recently announced on-line data base search and conferencing services that will enable users to locate and exchange information on such manufacturing issues as Computer-Integrated Manufacturing (CIM), Manufacturing Automation Protocol and Technical and Office Protocol (TOP).

One service, Amtech Information Exchange's Find-It, allows users to search

through ITI's data bases for information on manufacturing events, products and training materials, as well as trade, professional and standards associations.

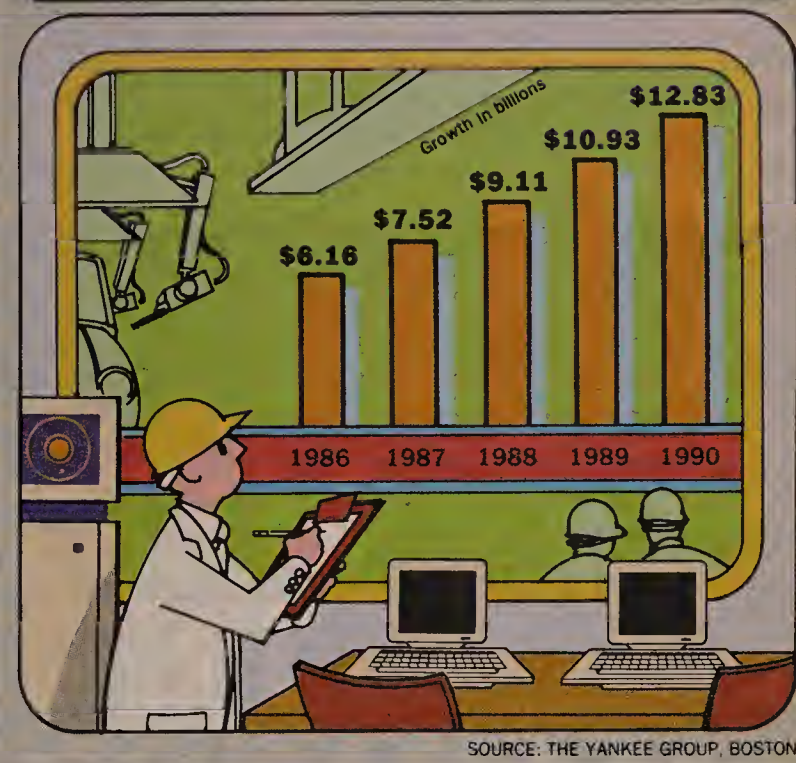
The second service, Amtech Information Exchange's Forum computer conferencing service, is available for private conferences to companies, users groups and other organizations. Conferences open to the public on manufacturing topics such as CIM, MAP and TOP will be offered later this year, the company said.

Kitty Bridges, data base development manager for the Amtech project, said, "These individuals need to share information." See ITI page 16

AM86 conference

The AM86 exhibition and conference, "Man and machine: The new partnership," will be held in Greenville, S.C., Nov. 3-6. Those manufacturers interested in attending the show should contact the Consortium for Automated Manufacturing at (803) 239-2967 for additional information.

Projected U.S. market growth of computers in manufacturing



FACTORY FACTS BOB WALLACE

OEMs and integrators hard to tell apart

The lines differentiating several types of manufacturing equipment and software suppliers are quickly fading.

Factory communications users are finding it increasingly difficult to distinguish between an OEM and a systems integrator.

An OEM generally already produces hardware or software.

One company may sign an OEM pact with another vendor that will allow the former to market the latter's products as part of its product line. The vendor receiving the OEM products generally resells these products as part of a large system.

For example, Digital Equipment Corp. needs a specific product to complete a system that it plans to sell to users. DEC may then opt to ink an OEM pact with Concord Data Systems, Inc. This agreement would allow DEC to purchase Concord Data Systems products, add them to one or more of its networking product lines and

sell the complete system to users. OEM deals often save vendors substantial amounts of time and money, because it is often less expensive for a vendor to purchase a commercially available product from another vendor than it is to develop the particular product itself.

A systems integrator does not manufacture software or hardware. A systems integrator assembles a turn-key system using products from two or more vendors. These middlemen deal directly with factory network users that request system solutions for specific applications ("Piecing together the networking puzzle," *Network World*, May 19).

For example, Company A needs a factory floor communications network that can tie together equipment produced by many different vendors. Company A asks the systems integrator to create such a network for the

See OEM page 16

"OEM deals save vendors time and money."

► CONTROLLERS

Programming guide out

PEABODY, Mass. — Siemens Energy & Automation, Inc. recently announced a do-it-yourself learning system for programming the company's Simatic S5-101U programmable controller.

The ruggedized, compact case integrates a 20-input and 12-output programmable controller with a

built-in simulator, a hand-held programmer and a study guide for the product.

The system costs \$1,250.

Siemens Energy & Automation, Inc., Programmable Controllers Division, 10 Technology Drive, Centennial Park, Peabody, Mass. 01960. ☐

INCIDENTALS

The Arizona State University College of Engineering and Applied Sciences is offering a variety of short courses on various aspects of Computer-Integrated Manufacturing (CIM) and the Manufacturing Automation Protocol.

The CIM series of courses includes "CIM function modeling methodology," "CIM information requirements modeling tool" and "CIM dynamics modeling methodology."

For additional information on the courses offered, contact Joseph Greenberg at (602) 965-1740.



The Society of Manufacturing Engineers (SME) announced the availability of a book that examines personal computer-based control, design and automated systems. SME also announced that users can purchase yearly subscriptions to *Computers in Industry*, an international journal that contains articles on the use of com-

puter aids in design, manufacturing, production and other automated areas through SME.

The Expanding Role of Personal Computers in Manufacturing traces the effect of reduced purchase and implementation costs on new personal computer-based industrial applications.

From sophisticated CIM requirements to cost-saving computer-aided design and control applications, the topics in the 200-page hardcover book examine the role of personal computers in manufacturing for both large companies and small shops.

The Expanding Role of Personal Computers in Manufacturing costs \$35, or \$29 for SME members. A one-year subscription to the bi-monthly *Computers in Industry* costs \$95, or \$85 for SME members. For further information on the book or the journal, contact SME at (313) 271-1500, ext. 418 or ext. 419.

OEM from page 15

specific application. The systems integrator may then opt to purchase the actual backbone broadband local-area network from Allen-Bradley Co. but may opt to purchase the broadband modems from Fairchild Data Corp. The systems integrator may then choose to purchase a plug-in board that hooks DEC VAXs to the network from Advanced Computer Communications Co.

Once the entire system has been assembled, the systems integrator will often install the network and related devices in the user's facility. Often, the systems integrator and the user company's technical staff will collaborate on the network design. Users contract sys-

tems integrators to install a network because, in many cases, the user company does not have the technically skilled staff necessary to assemble and later implement the factory floor net.

It is often difficult for anyone — users or nonusers — to tell the difference between consultants and vendors. Many manufacturing consulting firms also produce various flavors of Manufacturing Resource Planning software. Some of these firms also offer the expertise needed to integrate products from several different vendors.

It is ultimately the user's responsibility to determine which of these different manufacturing industry players can be of the most assistance with manufacturing nets. **□**

ITI from page 15

tion, but with the Forum service, they don't have to be in the same room to exchange information." The service may be especially attractive to user companies with many geographically dispersed locations. "It would be extremely difficult and expensive for people from all the locations to get together. In many cases, it would be unnecessary," she added.

The information location and exchange services are intended to aid manufacturing users who are struggling to understand which methodologies and products can be used to increase the efficiency of their production facilities. For example, the fledgling services will provide users seeking education on

manufacturing topics with contacts at organizations that offer educational services.

Through the Find It service, users access information on two data bases maintained on a Digital Equipment Corp. VAX 11/750 at ITI headquarters here. The VAX is linked to Compuserve, Inc.'s value-added network via an X.25 link. One data base contains all information submitted for the MAP/TOP Product Directory. A hard-copy version of the product guide will be available in September ("User guide set to bow," *Network World*, May 19). The second data base contains information about manufacturing and data communications-related conferences, seminars and workshops.

Bridges claimed Amtech's events data base is the only one that allows users to access in-depth information about events in the manufacturing world. She added that the data base has information on manufacturing events sponsored by both universities and corporations.

"In-depth means more than just information about who the event's speakers are going to be, the dates the event will be held and the cost of the event," she explained. "We list information on whether continuing education credits are available for the event, whether the event has been held before and what the response to it was, whether copies of the event proceedings are available and whether there will be any exhibits."

While intended as a wide-rang-

MEET THE MANAGER.



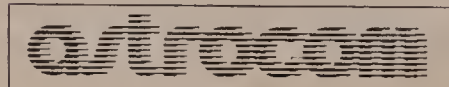
The new EASY™ II 3270 System

Manager. Astrocom's added intelligence to 3270 multiplexing!

Let the Manager work with your system to allow terminals to contend for the ports of up to three IBM® 3274 Controllers. Assignment of priority, direct connections and closed user groups can be made by menu selection.

- Save money, space, time and coaxial cable when adding and/or relocating terminals or controllers.
- Access up to three IBM 3274 controllers/systems with the Manager and Astrocom's SQUEEZIPLEXER®.
- Transparent to IBM or IBM-compatible Category A devices.
- Menu-selectable options allow customization of the Manager to tailor the 3274 Controller system network to match your system needs.
- Provides configuration flexibility for back-up.
- Individual status indicators provide at-a-glance diagnostics.
- Expandable to grow with your system requirements with up to 64 terminals on each Manager (Multidrop and Star configurations possible).

Call us today. Find out how EASY II can help your system. You'll wonder how you ever managed without it!



120 W. Plato Boulevard
St. Paul, MN 55107-2092
(612) 227-8651
Telex: 297421

EASY is a trademark of Astrocom Corporation.
IBM is a registered trademark of International Business Machines.
SQUEEZIPLEXER is a registered trademark of Astrocom Corporation.

*"It would be
difficult for
people from all
the locations to
get together."*

ing resource of manufacturing information, ITI's data bases do not mention manufacturing training organizations or consultants. ITI plans to allow users to access other on-line data bases through the Amtech service, but the company would not divulge which data bases are being considered.

There is no charge for use of either the conferencing service or the data base services. Users with modem-equipped terminals or microcomputers may access the services through the Compuserve network. The cost for this method of access is \$26 per hour during the day and \$18 per hour at night. Those users that access the Amtech services through a Tymnet or Telenet gateway to the Compuserve network will pay \$29 per hour during the day and \$21 per hour at night.

ITI also offers users an electronic mail service that supports communications between Amtech users. This facility can also be used to correspond with members of the Amtech staff and with researchers at ITI. **□**

COMMUNICATIONS MANAGER

► EDUCATION

Local network sheepskin offered

LAN management degree may be a first.

BY MARY PETROSKY

West Coast Correspondent

KLAMATH FALLS, Ore. — The Oregon Institute of Technology here will begin this fall what may be the nation's first program offering a bachelor's degree in the technology and management of local-area networks.

According to John Ward, chairman of the institute's Division of Business Technologies, the four-year bachelor of science in office automation degree program is an outgrowth of the current two-year asso-

ciate's degree curriculum in office systems technology. The latter two years of the bachelor's degree program are modeled after a curriculum designed by the Data Processing Management Association.

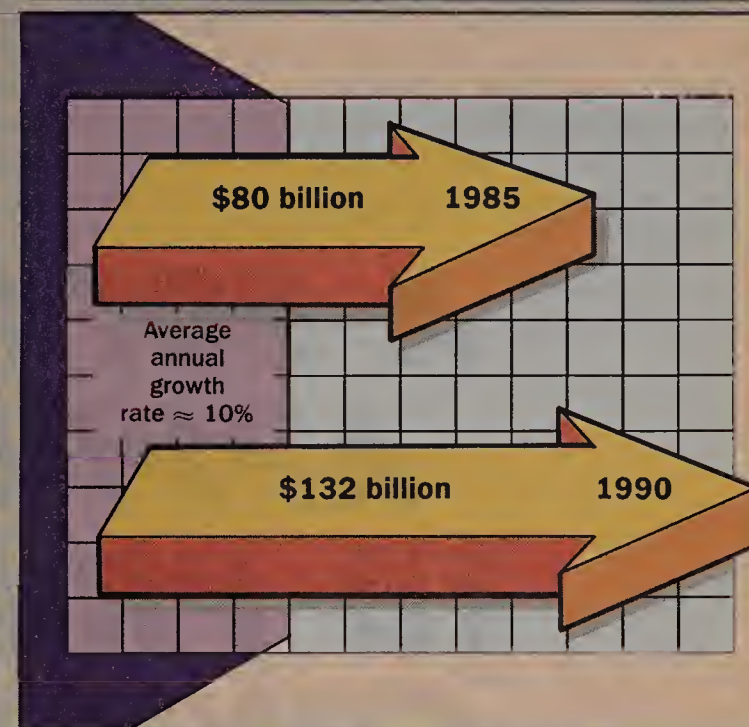
The associate's degree program in office systems studies includes three areas of specialization: medical, legal and industrial applications. In addition to the bachelor's degree program, the institute said it will offer a specialization in information systems to students in its bachelor of science degree program in industrial management.

See **Oregon** page 18

COS woos small users

Small vendors, users, consulting companies and government agencies may soon be able to join the Corporation for Open Systems (COS) without paying the individual dues of \$25,000 annually. COS is considering letting such small organizations join as groups. For example, 10 people or companies could pay a reduced fee and enjoy a single group vote.

Projected growth of network services



SOURCE: INPUT, MOUNTAIN VIEW, CALIF.

GUIDELINES

ERIC SCHMALL

The challenge of sculpting a network

An Italian legend has it that during the 16th century in a village near Rome, a young boy would peer into a stonemason's shop as he passed by on his daily journey to school. One day, the boy noticed that the stonemason had begun work on a freshly hewn block of white marble.

Each day, the boy glanced into the shop as the artist patiently carved away. Soon, a form began to emerge from the massive base. One day, the boy stopped to marvel at this magnificent image of a lion whose head and torso seemed to struggle from its base. The boy slowly ran his fingers over the lion's fierce features as he whispered to the stonemason, "How did you know?"

"Know what?" the artist replied, still chiseling at the detail. "How did you know there was a lion inside this block of stone?"

Like the artist, the communications manager must have vision that can lead a project from what could be to what is. The communications function has its greatest role when transformed into a strategic plan.

Schmall is network systems manager for an insurance holding company.

A strategic plan is the most important document a communications professional will ever compose. It predicts and forms the future of communications direction within the home enterprise.

For all of its importance, the strategic plan has a remarkably simple structure. Properly formed assumptions about the future are the core of the document. Valid conclusions, anchored in those assumptions, provide the essential outer framework. More specific plans — goals, objectives and tactics — represent the final layer of the structure.

The most important activity in the planning process is the proper formulation of assumptions. If these are inadequately identified, the strategic plan will have major structural faults. In order to provide the most completely rigorous composition of reasonable assumption, the planner, like the sculptor, needs to consider three fundamental dimensions.

The first of these is the most obvious — assumptions surrounding the communications industry. How should a strategist identify which technologies will survive and provide the most economic alternative for future use? Assumptions must be made

about the future regulatory environment, trends in tariffs and the battle lines for future competition between vendors. This task alone can comprise most of the time and space in the assumption-building stage of the plan. That is where many strategies falter.

The second dimension is just as important — where is the manager's parent company's industry heading? If the company is an investment bank, for example, the strategist must make a full assessment of the finance industry's future. The manager must formulate assumptions about that industry's future growth, trends and regulatory environment.

The final dimension of a strategic plan allows for the assumptions of growth, change and trends of the home enterprise itself. Where is the parent corporation heading? What will new markets, new acquisitions and the scope of the enterprise be? The strategist needs as much input as possible from senior staff members from other segments of his organization to address fully the corporation's business plans.

By interlocking all three items into a coherent whole, the planner will have accomplished the critical first step in the strategic planning process.

PEOPLE

Network Research Corp. has appointed **James Hunter** president and chief executive officer. Hunter replaces **Wayne Martson**, who reportedly left the company to pursue other interests.

John Brintnall was promoted to director of finance and chief financial officer of Computer Network Technology Corp.

Ken Bentley was appointed vice-president of the business unit responsible for point-to-multipoint satellite networks at Equatorial Communications Co. Before joining Equatorial, Bentley was president of Bonneville Telecommunications Co.

Anthony Lauck was promoted to corporate consulting engineer at Digital Equipment Corp. Lauck is responsible for the company's architecture and advanced development efforts in distributed systems.

If you are a recently promoted communications manager, or if a member of your technical staff has changed positions within the communications department, Network World would like to hear from you. Please send your name, new title and information describing your present and former position to Network World, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701.

Oregon from page 17

Students in the Division of Business Technologies spend their first two years learning technical skills, such as software and computer systems engineering, Ward said. The latter two years of the program focus on management skills. The goal of the program is to graduate students who can analyze technological needs, specify equipment and implement a network. To help students learn about networking, the institute is creating a network laboratory.

Ward said the program will prepare students to integrate communications devices within a networked environment. "We are not an engineering school," he said. "We are trying to take existing

communications devices and put them in a useful system. We're interested in data, text, graphics, voice and image integration — we want all of these systems to work in a network.

"Students absolutely must know how these systems work — how to take multivendor systems and make them work together," Ward said. "But it's one thing to be able to specify a network. There's another whole side, and that's being able to manage the network. The person who has both skills is far ahead of the others." To help develop management skills, the institute emphasizes communications capabilities, including writing and presentation skills.

The office automation program

is intended to prepare students for day-to-day network operation, according to Delbert Jones, assistant professor in the division. Areas covered include distribution of work, training, maintenance of data bases, definition of applications and definition of security systems.

In contrast, the specialization in information systems focuses on developing the "high-tech manager" — an individual who may operate at the departmental or interdepartmental level, Jones said. Areas covered in this track include equipment procurement and systems and applications design.

"The key issue is to recognize this need for high technology management. We have not approached

50% productivity from machines. The equipment needs management just like people do," Jones said.

In designing the program, representatives from the institute visited several universities to learn what courses were currently available. They also visited major corporations to research the skills companies are looking for in new employees.

"Hewlett-Packard [Co.], for example, said they may need to hire about six employees who had skills similar to what our office systems graduate will have," Ward said.

Student interest in the new program is high. "We've had people who've delayed their graduation to get in on the program," Ward said. He added that the first crop of degree students will be graduated in two years.

A SOFTWARE APPROACH TO PROTOCOL CONVERSION

Eliminate The Need For Additional Hardware

SIM3278 is a software communications package which provides complete 3270 emulation for IBM PCs and over 50 different types of inexpensive ASCII terminals.

All that is required for SIM3278 is an IBM mainframe running either VM/SP or MVS/VTAM and a communications front-end processor such as a 3705 or equivalent, that supports ASCII terminals.

SIM3278 installs in minutes and reduces costs through asynchronous communications, X.25 networks and Simware's unique screen writing techniques.

More than just a protocol converter, SIM3278 operates without any additional hardware or software modifications. Features such as on-line help, PC support, a multiple session manager and the ability to use inexpensive asynchronous communications make SIM3278 an extremely flexible and cost effective software solution.

Investigate how more than 500 customers across North America and Western Europe have benefited from our software solutions.

Call Simware today for more information and a free evaluation system.

SIMWARE

a practical approach to communications

14 Concourse Gate, Ste. 100
Nepean, Ontario K2E 7S6
(613) 727-1779, Telex: 053-4130
Call Toll Free: 1-800-267-9991

Distributed in Europe by:
The European Software Company Inc.



SIM3278 is a trademark (pending) of Simware Inc.

DIALOGUE

What do you think of the quality of workmanship of end-user equipment such as personal computers, keyboards, phone sets and modems?

"In general, the quality of equipment is good. Our biggest problem is setting up equipment and fixing it if it does break down. A bigger problem is finding qualified technicians who can diagnose problems.

Mack Castle

technical services supervisor
Garrett Corp.
Torrance, Calif.

"I find more problems with products from smaller companies that specialize in serving niche markets, such as special telephone sets and answering machines. These companies are shooting themselves in the foot because this kind of equipment is first used by executives and managers. I will not distribute the equipment throughout the rest of the company.

Dennis Newman

communications manager
Diners Club/Carte Blanche
Englewood, Colo.

"The quality of the products of almost all of the equipment we use has improved. There are so many different vendors that users really have to test the quality of workmanship of products by benchmarking.

Plenty of companies make equipment that does not deliver.

Dave Landers

senior network analyst
First Interstate Bank Co.
Seattle

"I think workmanship has improved, but the quality of the materials vendors use is cheaper. The new lightweight phones and keyboards are the best example of that.

By using cheaper materials, the manufacturers can give you products that have more options without charging more money or sacrificing workmanship.

Larry Van Ettan

telecommunications manager
Fuller Co.
Bethlehem, Pa.

NEW PRODUCTS AND SERVICES

► UNIVATION, INC.

New local-net offering bows

Ethernet system links to Token Ring, Unix; offers 802.3 compatibility.

BY JIM BROWN
New Products Editor

NEW YORK — Univation, Inc., the Milpitas, Calif., personal computer expansion board maker, entered the personal computer-compatible local net market by introducing its LANscape system at the recent PC Expo here.

*“The local net
boasts links to
IBM’s Token-
Ring
Network.”*

The baseband Ethernet and IEEE 802.3-compatible local net boasts links to IBM’s Token-Ring Network, IEEE 802.5-compatible local nets and Unix-based hosts or Transmission Control Protocol/Internet Protocol (TCP/IP)-compatible nets. Running a Univation modified version of Novell, Inc.’s Netware network operating system, LANscape supports a dedicated Univation file server for up to 100 users or an IBM Personal Computer acting as a file server.

LANscape-to-Token-Ring local net links are provided through a Token-Ring expansion board installed in LANscape’s file server. With the link, LANscape- and Token-Ring-attached workstations can transfer files and share peripherals. LANscape’s modified Netware operating system converts Token-Ring signals to run over the faster Ethernet, a spokesman said.

A Network Basic I/O System (Netbios) emulator is included on LANscape’s Netware operating system implementation. Token-Ring-connected devices recognize LANscape-connected workstations through the Netbios emulator. The Netbios emulator also allows LANscape workstations to run applications written for IBM’s PC and Token-Ring Networks.

Univation also offers a version of its Netware operating system implementation that supports communication between MS-DOS or PC-DOS systems and Unix systems over Ethernet using TCP/IP. The TCP/IP link to Unix supports file transfers and terminal emulation that makes personal computers look like Unix-based terminals communicating with a Unix host.

Other modifications Univation made to the Netware operating system support menu-driven diagnostics, usage monitoring, security, software loading and Univation Network Interface Card drivers for LANscape.

Connections to LANscape are made through Univation’s half-sized NC 516 Network Interface Card. The NC 516 supports carrier sense multiple access with collision detection and has 16K bytes of on-board memory, which is accessible by the network or the central processor. The board reportedly receives up to 32 packets in succession from the network without intervention from the central processor. An on-board Intel Corp. 82586 chip reportedly buffers up to 10 maximum length packets, or up to 1,518 bytes, received from the network until the personal computer is ready to process them.

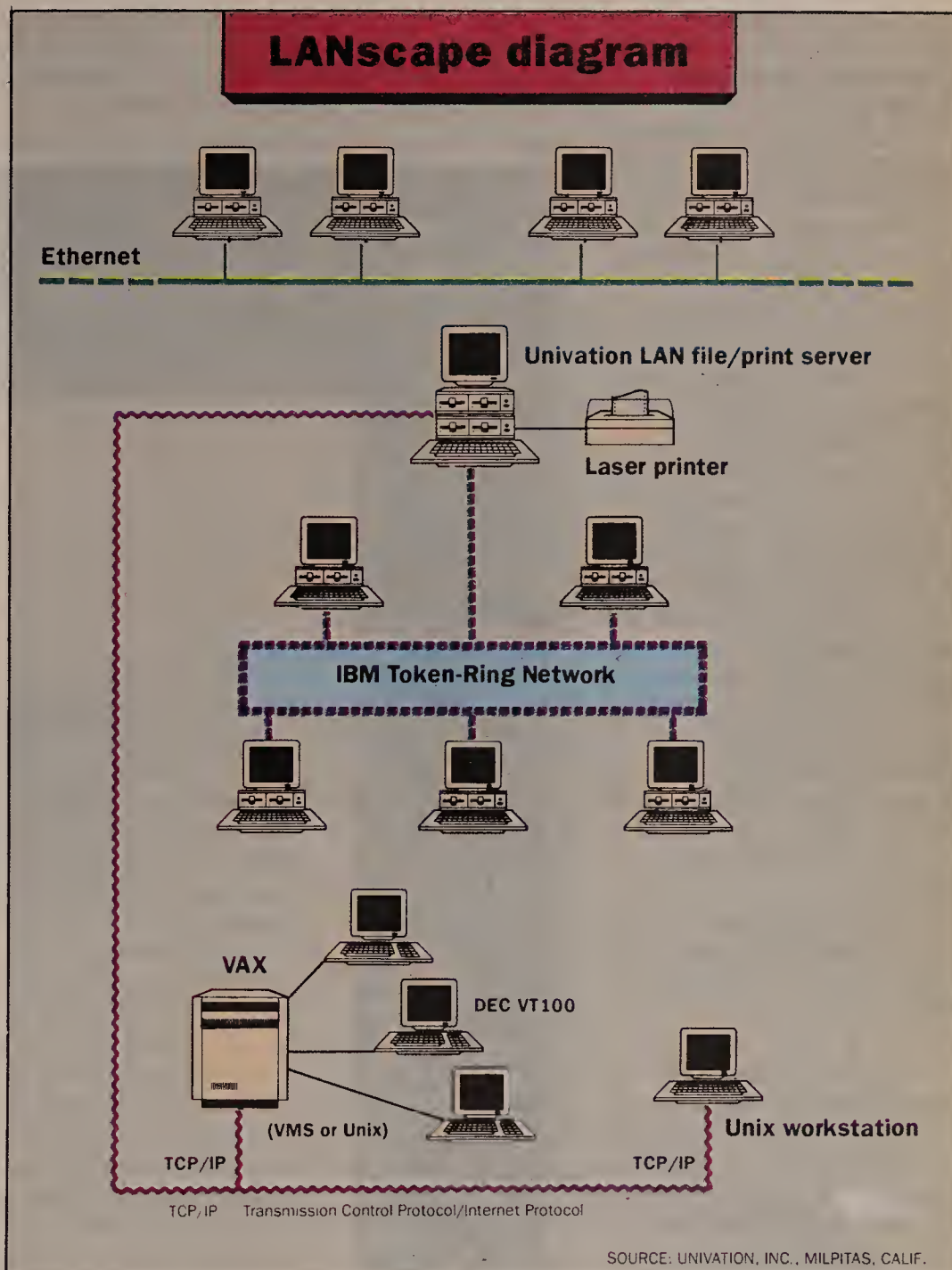
LANscape also provides an Intel Corp. 80286 microprocessor-based network file server, dubbed the FS 2000. The server has hard disk capacity ranging from 30M bytes to 1.2G bytes and a 10-MHz operating clock. It has a warning system to alert users to disk malfunctions.

A five-user LANscape without a file server will cost \$4,665. A five-user version with a 30M-byte FS 2000 file server lists for \$12,260. NC 516 Network Interface Cards are priced at \$495 each.

Company officials said they plan to expand LANscape offerings to include a communications server supporting remote links to asynchronous hosts, information servers and remote personal computers. The communications server is also being planned to support IBM 3270 Synchronous Data Link Control terminal emulation to provide remote micro-to-mainframe sessions. □

See inside for:

- Board-based front-end processors
- File transfer via PBXs
- Carterfone adds modems



NESTAR SYSTEMS

Revamped Plan 3000 file server unwrapped

150M bytes of storage capacity offered.

NEW YORK — At the recent PC Expo here, Nestar Systems, Inc. unveiled an enhanced version of its Plan 3000 personal computer network file server that more than doubles the storage capacity of the current model.

The enhanced Plan 3000 server offers 150M bytes of storage, 82M bytes more than the storage provided by the existing Plan 3000 file server. The Mountain View, Calif.-based firm also said it will continue offering the older Plan 3000 model at a reduced price. The 150M-byte version will cost \$16,500, and the 68M-byte version will cost \$12,500,

reduced from \$14,995. Both will be packaged with a Nestar 60M-byte streaming tape backup and Nestar’s collection of multiuser application software, dubbed Planpak III.

The enhanced Plan 3000 is a member of Nestar’s Plan series of local net products. The firm said the unit, to be available in September, can be expanded to support up to 255 networked workstations.

Both Plan 3000 versions support Datapoint Corp.’s Arcnet token-passing network protocol and are upgradeable to support IBM’s Token-Ring Network. □

*“Plan 3000
offers 150M
bytes of
storage.”*

PRODUCTS & SERVICES

Board-based front ends

Add-on Advanced Communications Processor (ACP) boards introduced by Plexus Computers, Inc. supply a number of network functions as well as doubling the number of users a Plexus P/35 or P/60 Unix-based minicomputer can support.

The ACP is a front-end communications processor that removes I/O functions from the main job processor's work load. In addition to supporting user terminals, the ACP supports Systems Network Architecture, Binary Synchronous Communications, X.25 and Defense Data Network communications protocols.

Each ACP board supports 16 serial ports, one parallel printer port, a Motorola, Inc. MC68000 processor, 500K to 2M bytes local random-access memory and a direct memory access processor supporting multiple 56K baud lines and a 2M-byte buffer memory. Each ACP board is priced at \$6,000 and will require some additional field upgrading.

Plexus Computers, Inc., 3833 North First St., San Jose, Calif. 95134 (408) 943-9433.

Board-based PC modem

For the IBM Personal Computer line, Anchor Automation, Inc. has announced a half-card, auto-dial, autoanswer modem bundled with Access communications software from Norton-Lambert Corp.

The Volksi is intended for asynchronous, two-wire, full-duplex direct connections. The modem supports transmission speeds of 1,200 and 300 bit/sec and is compatible with Bell 212A specifications. The Hayes Microcomputer Products, Inc.-compatible modem command structure allows either unattended or manual data transmission.

The software requires 64K bytes of random-access memory. Access automatically establishes the operating parameters to direct the modem with autodial, redial, autoanswer and hang up control.

The Volksi operates with most microcomputer communications software packages, including Norton-Lambert's Lync Telecommunications software package.

Volksi is priced at \$199.

Anchor Automation, Inc., 6912 Valjean Ave., Van Nuys, Calif. 91406 (818) 997-7758.

File transfer via PBXs

GTE Communication Systems Corp. has introduced a communications package allowing business personal computer users to transfer text and graphics through Omni SII and SIII private branch exchanges equipped with GTE's PD-200 Packet Data Transport

System.

A majority of IBM-compatible personal computers running MS-DOS Release 2.1 and using Xmodem protocol can use the GTE PD-200 Linkup in conjunction with an Omni PBX.

The application program will initially provide a capacity of four names and

systems addresses of up to 16 digits. All data will be error checked.

The GTE PD-200 Linkup works through the GTE Asynchronous Packet Manager.

Only standard twisted-pair wiring is needed between the APM and the Omni PBX.

GTE will offer the PD-200 Linkup at no charge to customers who own or purchase an Omni SII or SIII PBX that is equipped with PD-200.

GTE Communication Systems Corp., Business Systems Division, 2411 W. 14th St., Tempe, Ariz. 85251.

When you need a system the sum of its parts: Count

To maximize the availability of your data communications network today—especially multi-node T1 networks—you need a system that's even greater than the sum of its parts. At GDC, we know it's not just one part, but every part working together that makes your network a success.

Putting that knowledge to practical use has made GDC the leader in megabit multiplexing, with the largest installed base of private T1 networking products. We have maintained our leadership position with MEGANET, the ultimate service for cost-effective networking and control. It's the only solution that adds products plus services to equal a total networking system. A system that offers the broadest, most compatible line of products with built-in flexibility that work together to fit your particular communications requirements; from sophisticated multiplexed or switched multi-node T1 networks, to simple local area access.

Even more importantly, MEGANET includes comprehensive service and support with extensive people management capabilities for installation and training. With MEGANET, it all adds up to a total networking solution you can count on.



Multiply your wide area networking capabilities.

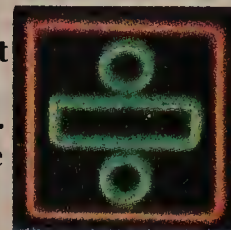
GDC's software-based MEGAMUX® II, a fourth-generation multiplexer, multiplies your multi-node T1 networking like never before.

It represents 10 years of GDC leadership in T1 multiplexing. It accommodates up to 16 aggregate links, with aggregate rates up to 2.048 Mbps. It includes an auto-frame feature to maximize efficiency of bandwidth allocation in multiple node, multiple aggregate networks. It uses the same data and voice channel cards as GDC's MEGAMUX® PLUS and KILOMUX® PLUS multiplexers to provide flexible, compatible and cost-effective configuration. And it incorporates redundancy and diversity switching to ensure reliability, with pre-programmed alternate routing in case of line failure.

With three types of voice channels, plus centralized control and management via GDC's NETCON® Network Management System, MEGAMUX II is the next step to higher level networking.

Network flexibility that branches out to every area.

A truly flexible communications system extends the reach of your network in every direction, including the latest technological developments in packet switching.



With our GEN*NET® family of concentrators, and our GEN* PAC X.25 PAD access devices, you have your own link to a packet-switched network. For high-speed, high-density applications, they offer the most economical, reliable way to connect geographically dispersed computers and terminals.

Eliminate network errors with greater accuracy and reliability.

It's a fact that 75% of the major telecommunications carriers in North America have standardized on GDC data sets for

internal use and resale. Why? Because our analog, digital and down-line programmable data sets offer greater performance, reliability and cost-effectiveness. They give you the broadest selection available for switched and private line networks. And they incorporate many features to help eliminate costly and time-consuming errors.

In addition, they include GDC's exclusive DataCommonality modular packaging to reduce spares and simplify operation and maintenance. The same plug-in circuit card can be used for both standalone and rack-mount units; front only access provides for ease of installation, quick changes and adjustments. And you can upgrade efficiently and cost-effectively within a limited network area, easily moving from lower to higher data speeds or from dial-up—switched network—to leased line operations.

PRODUCTS & SERVICES

Carterfone adds to AD-Comm 96/48 modem line

Carterfone Communications Corp. has expanded its Very High Speed Modem/Multiplexer ADComm 96/48 family with the ADComm H-modem series, targeted at microcomputer-to-host transmissions.

Featuring Hayes Micro-

computer Products, Inc.'s command set compatibility and dynamic bandwidth relocation, the product is primarily designed for interactive use with Ascii-based terminals.

The two H series modems provide a patented asymmetrical design to optimize dial-up line use; full-duplex

operation; character and data compression; 100% error protection using cyclic redundancy checking; and the ability to work on poor quality dial-up lines, both local and long haul, including satellite operation. Like the ADComm 96/48, the H series transmits asynchronously at speeds of up to

19.2K bit/sec.

Two versions of the ADComm H are offered: one for \$1,695 and one with a host-addressable, independent, statistically multiplexed printer channel for \$1,995.

A factory upgrade to the H series from the 96/48s, which remain available, is

\$200 when the 96/48 is returned.

Carterfone Communications Corp., 1341 W. Mockingbird Lane, Suite 1100 W., Dallas, Texas 75247 (214) 630-9700.

Photophone image disk

Pictures transmitted on Photophone video telephones can be permanently stored using an internal disk drive available from **Image Data Corp.**

A Photodisk drive under the Photophone screen will store up to 70 images. A Photophone, which transmits black and white photos over a single dial-up telephone line, can store up to 30 images in internal memory. But they are erased when the power is turned off.

An unattended Photophone equipped with a diskette can automatically receive and store images directly to the disk. The images can be copied, deleted and rearranged using Photophone's arrange mode. The Photophone uses standard 3.5-inch diskettes formatted in MS-DOS.

The optional disk drive adds \$875 to the Photophone price tag of \$8,550. Retrofits can be done by Photophone dealers or for \$995 in the factory.

Image Data Corp., 7986 Mainland Drive, San Antonio, Texas 78250 (512) 680-2727.

Rack-mounted modem

General DataComm, Inc. has introduced a full-duplex, rack-mounted modem capable of both asynchronous and synchronous data transmission.

Designed for applications over switched networks and private lines, the DC 224 features auto baud-detection in the answer mode, allowing it to adapt to the speed of the calls from originating modems. In addition, the device has autodial, autoanswer and redial capability, as well as automatic line equalization.

Diagnostics provided in the DC 224 include analog loop-back, remote digital loop-back and self-test capability. Options for the DC 224 include a plug-in board for X.25 packet network access and error correction.

The DC 224 will be available in the fourth quarter of 1986 and will sell for \$675.

General DataComm, Inc., Rte. 63, Middlebury Conn. 06762-1299 (203) 574-1118.

that's even greater than on General DataComm.

Add greater economy and efficiency to your local area network.

The range and flexibility of

GDC's products give you the ability to expand your local area network to greater distances at even greater speeds—extending it from desk to desk, building to building, city to city. By integrating our network management and diagnostic control capabilities, you can tie your local area network into a higher level system worldwide and still control it from a centralized point.

Together, our products cover the full range of local area and wide area networking applications. From our data sets and DATX™ data-over-voice products that provide the ultimate in simplicity and economy by offering plug-in installation and operation, DataCommonality packaging, and an automatic equalizer that adjusts to changes in line transmission; to our more sophisticated multiplexing and switching equipment.

We've got the solution to managing and controlling your network.

With GDC's NETCON family of Network Management Systems, you have the total solution to maximizing your network's operational efficiency.



NETCON gives you unsurpassed multi-level control over a wide range of facilities; digital network architectures, multiplexing systems, data sets, and local area networks. It provides comprehensive, sophisticated network management from a single centralized operating center. It assures total network availability with continuous surveillance; instant alarm, restoral and management reporting; and unparalleled diagnostic testing and control. And it provides inbound diagnostics and pre-equalization by individual drop on multi-point services.

Designed for maximum flexibility and total service, NETCON helps you meet the challenges of ever-changing applications and requirements while assuring total network availability. And its compatibility allows integration without obsoleting existing equipment.

There's no end to what we can do for you.



When you invest in T1 high-capacity systems and their associated

data communications networks, you expect much more than reliable products. With GDC's MEGANET, you get all the network service and support capabilities as well as a full range of products, that you'll ever need.

MEGANET manages your network with greater economy and efficiency. It addresses the multiple vendor problem by offering a total, single vendor capability. It addresses the changing technology problem by offering the most complete, technologically advanced products in the industry. And it addresses the network responsibility and control problem by controlling it from a single source.

Indeed, with MEGANET, you have a total solution to all your networking problems.

To find out more, contact Product Information Department, General DataComm, Inc., Middlebury, CT 06762-1299. Or call 1-203-574-1118 Ext. 6456.



General DataComm
Our systems are solutions.

Opinions

PERSONAL COMPUTING

MICHAEL DURR

Manage nets, not computers

When network technoids have nothing better to do, one of the things they like to argue about is local-area network genealogy. Some say the microcomputer local net is based on mainframe terminal network technology. Others say the local net is a product of the micro world, evolving out of the need to tie micros together.

Local nets are obviously built with one eye on the mainframe and one eye on distributed desktop computing. However, from a user perspective, local-area network genealogy is an important consideration. It has a big impact on the way these networks are used and managed.

Most people think of the local net as an extension of the personal computer. Users start with a personal computer — a personal productivity tool. They share some peripherals and communicate through their micros, and the result is a local-area network. The net itself becomes a kind of personal peripheral.

Certainly a local network can function as a personal peripheral; many are used just that way. But it's the same as using a mainframe system as a personal computer peripheral through the use of virtual host storage (VHS). Some personal computer users abuse a VHS system by logging onto their virtual disk at the mainframe and using it as an operational default drive. Using the mainframe or local net as a personal computer peripheral

Durr is public relations manager for Novell, Inc. in Orem, Utah, and author of several books, including Micro to Mainframe, published by the Addison Wesley Publishing Company, Inc.

works all right, but both systems have much more to offer.

To tap into the potential of the local-area network, think of it as a multiuser system. That system needs to be managed. Local nets appear to be simple, because they support DOS applications and DOS-like network commands. This appearance obscures the fact that, byte for byte, a local net needs just as much management as a minicomputer or mainframe network. The local net environment is no simpler, no more complex and no less in need of management than other systems.

A manager is required for activities such as adding new users to the network. At least there must be someone available who knows the procedure well enough to enter users into the system and give those users rights to appropriate directories.

When local net security is needed, the role of the network manager must be more formal. One or two people are assigned as managers and are given special privileges that no one else has.

On the other hand, there are other aspects of local-area networks that don't specifically require a manager but do benefit from some sort of management. One of these is ease of use.

In its basic form, a local net workstation is more difficult to use than a stand-alone workstation. Users are still using DOS applications on the network, but they've now placed an additional system, the network operating system, between themselves and the applications. By networking to big storage disks and other new peripherals, they've also

increased the complexity of their environment.

The flip side of the coin is that, properly managed, a local net workstation can be much easier to use than a stand-alone workstation. The workstation can be configured so that by logging on, paths are set up and an application is loaded and readied for use.

For people who use several applications and output devices on the network, most managers install a menu-driven front end. When the user selects an application, an output device or any of the other choices, a series of predefined operations is executed in background batch files.

Using a menu, a user might request Lotus Development Corp.'s Lotus 1-2-3, a Lotus data file and a Hewlett-Packard Co. Laserjet printer. When the user makes the selections, a batch file is executed. It first instructs the user to insert the Lotus key disk in Drive A. After the disk is installed, the user presses any key, and the batch file makes the remaining attachments automatically. The user doesn't have to look up a pathing syntax or remember the directory location of Lotus. It's all handled by the network manager through the menu front end.

After there is a decision to provide some network management, the next question is who should do the job. Often, the manager is simply someone who gets the assignment, goes through training with the vendor and is presented with the set of documentation.

From this obscure starting point, there might be some ways to enhance the manager's value to the organization. One option is

See **Local nets** page 33

MODERN MANAGEMENT

JAMES CARLINI

Vendors sing the blues

Third in a four-part series.

Before divestiture, AT&T had the best educational program around for workers who took advantage of all it had to offer. As Ronney Harlow, president of the interconnect company Private Telecommunications, Inc., put it, "You could work in the Bell system and obtain the equivalent of a doctorate in telecommunications with all of the available training." Because AT&T did not realize this, it has lost a good number of experts during the last few years to its competitors, which offered better salaries and advancements.

Here are four specific actions AT&T upper management should take to augment its integrity:

- Cut the levels of management. Let's face it, a fourth-level manager is about the lowest-level authority

Carlini is president of Carlini & Associates, a management consulting firm in Westmont, Ill.

that can make a final decision on a user issue of any consequence.

- Clean house in middle management. Get rid of the ex-coin counters and cable pullers who made it up through the ranks. They don't know the business that AT&T is in today and only get in the way of those who do.

By the way, early retirement programs like the Management Income Protection Plan don't take care of this personnel problem because the wrong people in the company apply for it.

- Promote people who know the business. Advance those who went through all of the advanced training in the communications system representative program. They are the ones who understand the total information technology picture, and they should be in managerial positions.

The only trouble with this idea is that most of the people who went through all of the training have already left.

- Lay out an organization plan and stick to it. Many people don't know that the long-range plans for AT&T included reorganizing every six months. It is impossible to judge how the organization is doing if there are so many changes in such a short period of time.

However, it does give incompetent managers a chance to clean up their acts before anyone catches on to them.

AT&T is not impressing its rank-and-file employees, let alone its customers, who are tired of seeing their account executives come and go as quickly as Chicago weather.

The bottom line is that AT&T has two possible ways to go. It could be either the premier telecommunications company that it should be, or the company that did not adapt to the market.

What about the other vendors out there? There are many that deserve equal time.

ITT, for one, doesn't appear to have enough support or redundan-

cy built into its network at certain points. A brokerage house that uses ITT's data service was down for three days when a connection to New York could not be restored.

MCI Communications Corp., trying hard in its number two position, is driving the AT&T Communications, Inc. people crazy by providing superior service. When a midwestern company decided to shut down one of the nodes on its network, MCI didn't charge for reinstalling the firm's 30 or so circuits at the new location.

AT&T Communications' manage-

"The long-range plans for AT&T included reorganizing every six months."

Opinions

TELETOONS — By Phil Frank



That's strange... network security usually allows you three incorrect log-ins..

PROTOCOLS

DOUGLAS GOLD

Error-free is the key

Getting your personal computer to talk with someone else's is just like engaging in a telephone conversation using a line of such poor quality that you hear only every fifth word: Communications isn't much good without error-free data transmission.

The task of personal computer communications is made even more complex because of the medium used: the public-access telephone lines. Such lines are limiting because ambient noise levels on the lines prohibit the high-speed data transmission that modern data communications requires. To circumvent this problem, various error-detection protocols have been submitted in both proprietary and public formats so users can transmit error-free data.

In business, the degree to which a company's information is accurate can determine its success or failure. For personal computer communications to be of worth to a company, signal degradation has to be addressed.

Xmodem, today's most widely used error-checking protocol, was developed with the problem of signal degradation in mind. But Xmodem has no inherent interactive capability. It is strictly a file transfer protocol that sends data in one direction, then waits for the acknowledgment from the receiving connection.

Using a 1-byte value, Xmodem checks the number of bits it receives in the packet with the number it was supposed to receive. If the totals don't match up, the packet is resent. If the numbers do correspond, the transmission is made. Although the sender can acknowledge whether the packet has been sent, there is no indication whether there were any errors in it. Initially, Xmodem was used on the many dial-up bulletin boards that became popular among personal computer users. The protocol was further developed by Hayes Microcomputer Products, Inc. and has become a de facto standard for low-level personal computer-to-personal computer file transfer.

Xmodem works relatively well at 1,200 bit/sec, but it has difficulty handling the new genera-

tion of 2,400 bit/sec modems. It is totally unsuited for 4.8K or 9.6K bit/sec levels of communications.

Kermit is another popular error-checking protocol adapted primarily for file transfer between microcomputers and mainframes. This protocol was developed by Columbia University and, soon after, was offered to the public. Its most popular feature is its universality, which allows the protocol to interact not only with personal computers but also with different mainframes. Kermit also includes a functional method of transmitting 8-bit data over 7-bit data connections. Kermit has a special advantage: Versions for many different computers are available free from computer users groups and other sources of public domain software.

Two protocols that are vying to fill the shoes of Xmodem are X.PC, from Tymnet/McDonnell Douglas Network Systems, Inc. (Tymnet), the value-added network provider, and Microcom Networking Protocol (MNP), from modem manufacturer Microcom, Inc.

The primary difference between these two is that MNP is a hardware solution and X.PC is a software solution, although both have been implemented in hardware and software offerings.

Although they've tried to have their solutions accepted as industry standards, both companies have had their difficulties. Tymnet's problem is that its competitors in the value-added network business, such as Telenet and Uninet, would rather not standardize on a Tymnet protocol. Microcom's problem is that vendors are not comfortable endorsing a competing modem manufacturer's software effort.

Each product is asynchronous but capable of synchronous communications, so that 20% of the overhead — the stop and start bits that frame each character in asynchronous communications — is eliminated. Although these products have synchronous-like capability, their asynchronous transmission makes them unsophisticated and slow.

From a user standpoint, asynchronous is less expensive than synchronous because of conversion costs. Nevertheless, the standards organizations are fo-

See Protocols page 33

ment is facing the same problems that AT&T Information Systems did two years ago. They don't understand competition and are starting to see that some people are interested in competitive pricing.

Consider a certain software package designed as an in-house system for a hospital, which included several applications. It was designed to run locally attached terminals at 56K bit/sec but was being sold as a distributed system for many hospitals. The facilities needed to support the system were 56K bit/sec lines, preferably digital. Try to get that type of service in a small-town hospital.

Often, vendors oversell the capabilities of their products and services. A computer-aided design and manufacturing (CAD/CAM) software vendor that was about to close a deal with a customer tried to say that it was possible to run a multitasking system on a Hewlett-Packard Co. 9000 Series 300 and operate the CAD/CAM application at the same time. When asked to clarify this, the HP sales representative said the customer could run one or the other, but not both at the same time. The honesty of the HP salesman was highly commendable.

However, the slyness of the software vendor prompted the customer to solicit competitive bids.

Finally, yet another Rbotch, or regional Bell operating telephone company hassle (a problem examined in the first part of this series, "The search for integrity," *Network World*, June 16), was related by a financial company that has many circuits terminating in New York. Its carriers, AT&T and US Telecom, Inc., have been trying to provide better service, but are stifled by Nynex Corp. at the central office level on area codes 212 and 208. When asked what they were going to do about 30,000 calls per day being blocked in those central offices, the Nynex representative said, "We will put in one trunk." When asked if it would be a T-1 trunk, the representative answered no, that it would be a "single trunk." After the telecommunications manager for the financial company said that was ludicrous, the Nynex representative retorted, "Blow it out your ear." Now, that's a catchy marketing phrase. **□**

Next month, the conclusion of this series will take a close look at corporate users.

Gold is senior research analyst of communications software research for International Data Corp. in Framingham, Mass.

Features

July 21, 1986

Northern Telecom Ltd.'s Edmund B. Fitzgerald

The CEO of Northern Telecom credits the divestiture for giving telecommunications users a choice. Now Fitzgerald and Northern Telecom must make some choices — whether to try to boost NT's drooping income or acquire a communications company.
This page.

Big bucks in T-1 mux

With more than 30 T-1 multiplexer vendors vying for market share, users are taking advantage of the multitude of mux features and functions. As communications managers are treated to more flexible solutions, ISDN gets a little closer to becoming reality.
Page one.

Speak now or pay later

The cost of operating nationwide networks may spiral if large user companies fail to make their desires known to policymakers. It's uncertain how much power Sen. Robert Dole's recently introduced bill will shift from U.S. District Court Judge Harold Greene to the FCC. And that won't restore the clout the agency lost to the states in the recent U.S. Supreme Court decision Louisiana Public Service Commission vs. FCC.
Page 27.

► PROFILE

Northern Telecom Ltd.'s Edmund B. Fitzgerald

BY KARYL SCOTT
Washington, D.C. Correspondent



*“Divestiture is
the greatest thing
since sliced bread,”*

according to Northern Telecom Ltd. Chairman and Chief Executive Officer Edmund Fitzgerald.

In addition to being a boon for the Mississauga, Ont., telecommunications equipment manufacturer, divestiture has been a great step for corporate telecommunications users, Fitzgerald says.

“Users now have a choice. They can do whatever they want to do,” he says. “We see the merger of voice and data communications. We have digital switching and [Integrated Services Digital Network].”

Fitzgerald adds that he isn't certain there would have been much innovation if divestiture hadn't occurred.

“Users are happy with divestiture because now they have a say in what's being devel-



PHOTOS © 1986 JOHN GUIDER

oped," he says. "Years ago, users took what was given to them. Today, they can push vendors to develop what they want."

The 59-year-old Fitzgerald, who also co-founded the Milwaukee Brewers baseball team, has been "head coach" at Northern Telecom since 1984. Prior to that, he was president of Northern Telecom, Inc., the U.S. subsidiary, which is headquartered in Nashville.

Fitzgerald follows in the path of corporate leadership set by his father, Edmund Fitzgerald, who was chairman of the board of Northwestern Mutual Life Insurance Co. A cargo vessel named after the elder Fitzgerald sank in a storm on Lake Superior in 1975 and passed into legend as the subject of the contemporary Gordon Lightfoot song, "The Wreck of the Edmund Fitzgerald."

In his six years at Northern Telecom, Fitzgerald has steered the company away from some

unprofitable acquisitions and honed in on the businesses that have benefited Northern Telecom. It's been rumored that Northern Telecom is seeking to acquire a company that will enhance its position in the communications market, but Fitzgerald says this is just idle speculation.

He has been quoted as saying such an acquisition would have to enhance Northern Telecom's telecommunications network business. In the view of many industry analysts, however, Northern Telecom will have to make an acquisition to continue its recent growth.

During Fitzgerald's Northern Telecom tenure, the U.S. subsidiary surpassed the parent company in its earning ability. In 1981, Northern Telecom's revenue was \$1.88 billion. Of that sum, 48% came from Canadian sales and 41% from domestic sales. In 1985, profits rose to \$4.26 billion, with 67% generated in the U.S. and 26% in Canada.

Northern Telecom's tremendous growth during the past four years has slowed, and the firm reported an 18% decline in earnings for the first quarter of 1986. Company officials say they expect net income for the first half of the fiscal year to drop by more than 20%. The drop reflects a decline in central office switch purchases by firms such as the Bell operating companies. Northern Telecom has faced increasing competition from AT&T, which has shown a renewed interest in the central office switch and private branch exchange markets. Today, Northern Telecom is neck and neck with AT&T in those markets.

Ironically, Northern Telecom, then called Northern Electric, was the Canadian manufacturing arm of AT&T until the U.S. Department of Justice ordered AT&T to divest the Canadian unit in 1954. Today, Fitzgerald has a hand in

 Continued on page 26

From page 25

Northern Telecom's drive to gain a lion's share of the postdivestiture marketplace by enhancing its basic switch product lines.

Northern Telecom is also developing products that facilitate the ongoing convergence of telecommunications and data processing. An example is its Meridian DV-1 Data Voice system, which provides functional voice/data integration by combining the capabilities of a private branch exchange and a departmental minicomputer.

But the bottom line is that users want connectivity. "They want end-to-end, transparent connectivity," Fitzgerald says. "High technology may give users a warm feeling, but in the end, they don't

really give a damn about it. They have devices on their desks, and the last thing they want to know is what's going on inside."

The problem faced by most busi-

nesses today is not how to acquire more information, but how to use the information they have more effectively and economically. "The effect of the merger of telecom-

munications and computing has been the ability to handle knowledge better," Fitzgerald says. "We have access to more information than we can handle. I never found a customer who wanted more information. He wants information on a more timely basis that is more readily available. Connectivity means more efficiency in using available information," Fitzgerald says.

Fitzgerald is fond of saying that Northern Telecom is in the connectivity business. The company is constantly working with users to develop systems that meet their requirements.

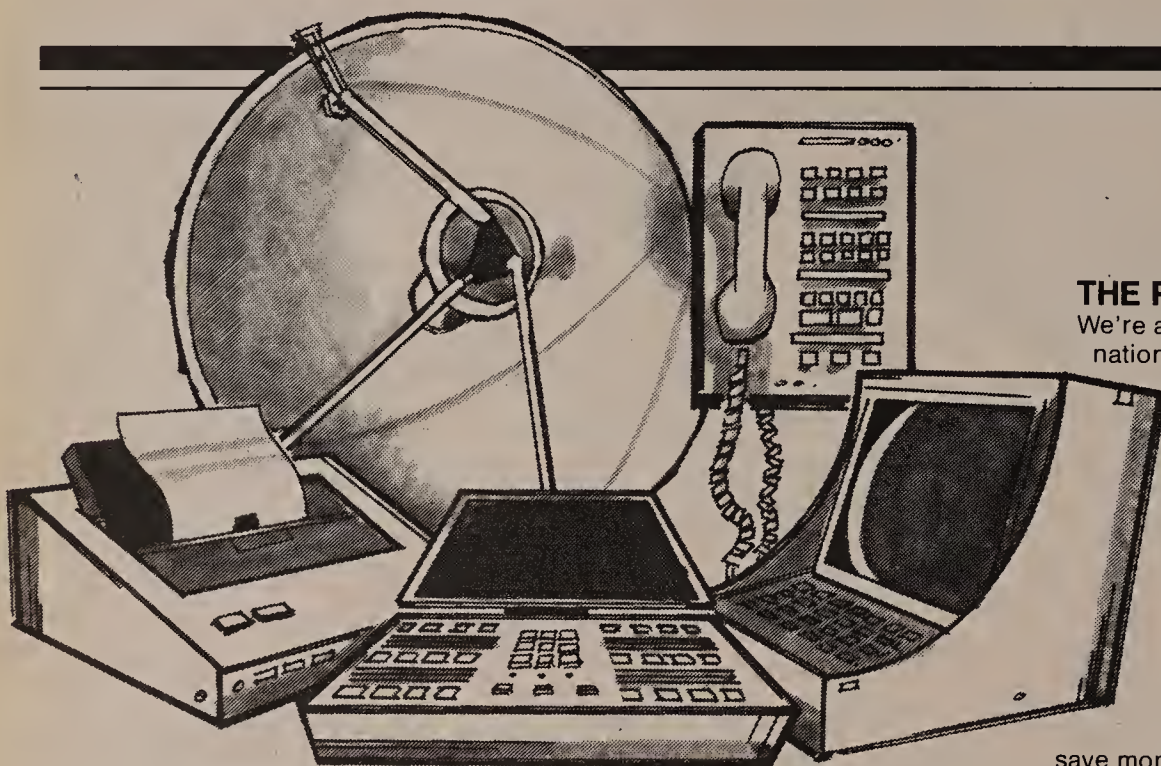
"The problem is that the voice world is way ahead of the rest of the world in terms of connectivity," Fitzgerald says with a natural prejudice toward telephony. "A key to future success will be getting voice-grade connectivity to all types of communications."

The ultimate goal of the industry, he says, is to develop standards that will allow manufacturers to produce equipment that includes voice and data capabilities, interfaces, protocol converters and modems in a single unit. Northern Telecom has introduced an integrated voice/data workstation. Al-

"High technology may give users a warm feeling, but they don't really give a damn about it. They have devices on their desks, and the last thing they want to know is what's going on inside," Fitzgerald said.

"Fitzgerald is fond of saying that Northern Telecom is in the connectivity business."

TALK TO US ABOUT COMMUNICATIONS SYSTEMS.



Whether the system is Rolm, Bell, Northern Telecom, or any other computer-controlled telephone system, Randolph will provide a unique, highly flexible communications lease for your company as we have already done for many major U.S. corporations.

Keep pace with technology by having lease flexibility; lease/purchase your cabling; lease and swap out your handsets; lease and upgrade your central switching units as your needs dictate.

THE UNBUNDLED LEASE.

The structure of our lease provides for maximum flexibility at the end of the lease term. By having separate lease schedules for handsets, central

switching and cabling, you have the option to buy, extend the term or terminate any or all of these component schedules as your plans dictate at that time.

TWO DECADES OF HIGH-TECH LEASING EXPERIENCE.

What our seasoned leasing management team has done since 1965 with computers they are now doing with communications systems.

THE RIGHT CONNECTIONS.

We're an important part of one of the nation's oldest and leading financial institutions... the Bank of Boston. With the Bank's financial capabilities behind us, Randolph customers benefit even more from the combined efforts of the best high-tech leasing and financing people in the United States.

GIVE US A RING.

Chances are we can solve a lot of problems for you and save money too. Talk to Randolph now about your communications system. Call 800-243-5307.

537 Steamboat Road
Greenwich, Connecticut 06830
203-661-4200 • 800-243-5307

Randolph



THE FIRST NATIONAL BANK OF BOSTON
BANK OF BOSTON

though the market has yet to take off, Fitzgerald claims that Northern Telecom remains committed to integration on all levels.

"Intelligence on the desktop," is how Fitzgerald terms the future direction of the voice/data market. Users will have a multiplicity of solutions, greater intelligence built into computing systems and networks to extend that intelligence to devices. Intelligence will not be static or stationary. It will not reside in a single location, such as a central office switch or desktop computer, he says.

Fitzgerald believes software is the way users will use this intelligence; therefore, Northern Telecom has been paying more attention to software development. This year, Northern Telecom increased its research and development budget to an all-time high of \$454 million.

"Innovation is applicable not just in product design and manufacturing, but also in all phases of selling and servicing," Fitzgerald says. "I like to say our business is helping our customers do things better. Our business is to deal with, adapt to and manage change to our customers' benefit, which ultimately is to our benefit." □

Speak now

*Imminent
communications
policy shifts
spell budgetary
troubles
for large users.*

or pay later

BY H. DANIEL MCFARLAND
Special to Network World

A recent U.S. Supreme Court decision against the Federal Communications Commission, coupled with the introduction of a bill by Sen. Robert Dole (R-Kan.) that would restore the FCC's authority to set communications policy, is making telecommunications a major strategic concern for large users of telecommunications services and equipment.

These users may find their costs increased, their range of services diminished and their ability to bypass or compete with AT&T and the regional Bell operating companies restricted. In response, users must develop a strategy that deals with these changes and must ensure that their concerns are addressed in what could become a national telecommunications policy.

Corporate telecommunications managers are responsible for the efficient operation of corporate networks. But two-thirds of the cost of long-distance service subsidizes local exchange service. Large users pay additional subsidies at the state level to support basic residential service.

Users must be aware of regulatory changes that will affect the

McFarland is principal engineer at R.W. Beck and Associates in Washington, D.C.

rate at which these subsidiaries are reduced.

A federal case

The U.S. Supreme Court, in the case of Louisiana Public Service Commission vs. FCC, overruled the FCC's preemption of state commissions in setting intrastate depreciation rates for telephone companies. This decision returns the power to set intrastate depreciation rates to the states. The FCC's depreciation rulings would have shortened average depreciation lives and eliminated inconsistencies among states.

A rollback in intrastate depreciation rates by state commissions would limit capital recovery by the telephone companies, retarding their ability to invest in their networks. Corporate telecommunications costs will be increased and performance decreased if network capability can't keep pace with demand.

The major effect of the Supreme Court's decision may not be on depreciation rates, but on the FCC's power to preempt state commission decisions.

Specifically, the FCC may find its authority limited in imposing end-user access charges, in loosening separate subsidiary requirements as part of its Third Computer Inquiry decision, in revising the Uniform System of Accounts, which determines costs Bell operating companies can factor into their

rates, and in deregulating inside wiring. Because the Supreme Court decision shifts the balance of power in favor of the states, large users may find their telecommunications costs significantly affected by the decisions of state regulatory commissions. Rather than expressing their interests before the FCC, large users will have to deal with many state commissions.

As a result, the cost of operating a nationwide corporate network will increase.

The Dole effect

On June 19 of this year, Sen. Dole introduced Senate bill S. 2565, known as The Federal Telecommunications Policy Act of 1986. The proposed legislation, according to Dole, "consolidates in the FCC all federal telecommunications policy, including the AT&T and GTE [Corp.] consent decrees, which have governed the telephone and telecommunications industries in the U.S. since 1982." Since Congress oversees the FCC's operations, Dole sees this bill as appropriately moving the policy-making function from the judiciary to Congress and the FCC.

The AT&T decree restricts the seven RBOCs from offering interlocal access and transport area long-distance service and from manufacturing or operating outside their franchised areas. Currently, they cannot compete in new mar-

kets without Justice Department review and Judge Greene's court approval.

The FCC, on the other hand, could administer policy on a broader basis than antitrust. Sen. Dole is especially concerned about the effects of such restrictions on foreign trade, jobs and consumer choice.

On its face, this bill would mean an increased probability of dropping restrictions on RBOCs that keep them out of long-distance and other markets. However, congressional legislation is likely to be affected by a variety of special-interest groups. The legislation that emerges from congressional deliberations may retard the ability of the FCC to reduce the subsidy that large business customers pay in interstate rates. Congress also might write into statutory language restrictions on the ability of large users to invest in their own bypass telecommunications facilities as a means of avoiding higher telecommunications costs.

At a minimum, the Dole bill, as presently written, introduces considerable uncertainty into telecommunications regulation.

Even if this legislation is enacted, Judge Greene must approve all requests for waivers of the Modified Final Judgment. If he does not approve such a request, higher courts will no doubt be asked to decide the tricky question of jurisdiction.

 Continued on page 28

From page 27

tion between the legislative and judicial branches.

Another example is a section of the bill that allocates the costs of interexchange switching and transmission to interexchange users. It also excludes these costs from being figured in by the BOCs when determining charges for either local exchange telecommunications or local exchange access. However, nowhere does the bill define costs.

The method for recovering joint and common costs shared between local exchange and interexchange services is not specified. These costs are largely outside-plant costs. If joint and common costs must be recovered from interexchange traffic, large users will con-

tinue to pay subsidies. But if recovery must come from exchange rates, residential customers will face large rate increases.

Potential amendments by various special-interest groups may make matters worse. The legislation, if enacted, also would result in protracted litigation over the definition of costs and other ambiguities. This would retard the ability of the FCC and telecommunications suppliers to reduce service costs.

Also, there may be significant interdependent effects between the Louisiana decision and the Dole bill. While the Dole bill would give the FCC the authority to drop the restrictions on AT&T, the RBOCs, GTE and the GTE operating companies, the state commissions may be

able to retain some of those restrictions in their intrastate jurisdictions. The result would be piecemeal deregulation or no deregulation of some products and services. Large users may find that they can purchase certain services in some states but not in others. Alternately, there may be considerable variation between states concerning the terms on which users can purchase which services.

Planning ahead

Now is the time for large communications systems users to act. They must evaluate the effect of the introduction of the Dole bill and the Supreme Court decision on their telecommunications operations, as well as on their corporate

and industry interests.

For some large users, the effect may be to increase drastically corporate telecommunications costs. Others may be affected by competitive considerations. For example, the FCC may not, as Judge Greene stated in a recent speech, have the capability to detect and deter cross-subsidization and other anticompetitive behavior.

Bruce Fein, former FCC general counsel, notes, "While the full ramifications of the Louisiana Public Service Commission [decision] remain clouded, the decision creates a handsome opportunity for intrastate communications carriers and regulators to recast technical and strategic plans and planning."

Large users should first ask whether their interests are best served by regulation or deregulation. If regulation is in their interest, should regulatory authority be concentrated at the FCC or should it be dispersed back to the state commissions?

For example, a large user company with most of its operations in one state may prefer that more policy-making clout be vested in its home state than in Washington, D.C. On the other hand, if the user is a large financial institution and must operate in many states, differing state policies are a disadvantage.

If users are best served by deregulation, they should consider what safeguards against cross-subsidization and anticompetitive behavior are necessary.

Under complete deregulation, for example, the local telephone companies could charge whatever they wished in the short run because initially, little competition would exist, particularly in local exchange services. Users might want to lobby for legislation to prevent this. Another safeguard might be legislation similar to Computer Inquiry III, which requires accounting separations between monopoly services and the more competitive services.

This may be a key opportunity for developing a national telecommunications policy, and users should be involved in shaping that policy.

Large users should analyze the impact that recent changes in the telecommunications environment might have on their interests, identify other companies and users with similar interests and communicate those interests to federal and state decision makers. This requires a combination of approaches that will create an environment in which the legitimate concerns of large users can be presented.

This effort means more than stepping up lobbying programs already in place. Corporations should also make their positions known through the print and broadcast media, by coalition building and through speaking engagements, seminars and other public communications devices.

Unless users act to press their interests, telecommunications policy is likely to develop in ways that hinder or actually harm their interests. **□**

"STAY IN TOUCH"

Tau-tron's Intraplex T1 Multiplexer Network Solution "Keeps You In Touch."

Call our Networking Consultant 1-800-TAU-TRON
Ext. 908 (outside MA) or write to:

tau-tron 
A UNIT OF
GENERAL SIGNAL

10 Liberty Way, Westford, MA 01886
(617) 692-5100

FEATURE FOCUS

BIG bucks in T-1 MUX

Continued from page 1

many of the benefits that ISDN backers advocate, such as end-to-end digital communications and reduced communications costs. Not surprisingly, T-1 services are selling like gangbusters. A number of industry analysts claim that the T-1 multiplexer market is the fastest growing sector in the communications industry.

T-1 is a bulk digital transmission facility that operates at speeds of 1.54M bit/sec. Voice, data and video can be sent over a T-1 facility (which consists of multiplexers at user sites that attach to a T-1 trunk) that resembles a private line and is supplied by a local or long-distance carrier.

In the late 1970s, T-1 technology was not catching on among large corporations. The scarcity of T-1 multiplexers contributed to that lack of interest. Three factors changed that scenario. In the early 1980s, tariffs for the service were dramatically cut. Price cuts continued during the following years, and T-1 has become a cost-effective so-

lution. "Only eight months after installation, our T-1 facility was saving us money," notes Hank Matson, senior system engineer of voice planning at Pan American World Airways in Miami.

A second factor for the rapidly expanding renewed interest in T-1 is increased competition. Currently, more than 30 vendors offer T-1 multiplexers. To differentiate their wares, companies have begun to offer a wide range of features and functions. For example, T-1 multiplexers initially divided the 1.544M bit/sec lines into 24 channels of 64K bit/sec each, a technique known as DS-1 framing. Various multiplexers enable users to get as many as 512 channels on a trunk, and transmission speeds can range from 50 bit/sec to 1.54M bit/sec.

Divestiture represents a third reason for the growing interest in T-1. Since divestiture, many large corporations have decided to dump certain traditional telephone company services. Managers have learned that end-to-end reliability, a given when AT&T was in charge of most of the network, has been

 Continued on page 30

From **page 29**
lost. Whenever a problem rears its ugly head, fingerpointing often results. Rather than mediate arguments, corporations have taken many network management functions in-house. A number of tools that enable a corporation to mirror a telephone company have begun to migrate to the commercial sector.

Seven months ago, for example, Bank of Boston expanded its T-1 facilities. For more than two years, the bank had worked with T-1 multiplexers supplied by General DataComm Industries, Inc., located in Middlebury, Conn. The bank wanted to increase its number of T-1 nodes and install devices with more flexibility than its DataComm products, which were first-generation multiplexers suitable for a simple point-to-point network.

Bank of Boston evaluated four vendors before it purchased its T-1 multiplexers. Cohesive Network Corp. wasn't chosen because it had just begun shipping its product, CN-1. DataComm and Timeplex, Inc. didn't have suitable high-end products. After a lengthy process, the bank decided on multiplexers from Network Equipment Technologies Co. (NET), a Redwood City, Calif.-based vendor.

A variety of features

T-1 multiplexers vary greatly, and some features are not well-suit-

(Dacs), an AT&T service, recognizes only bytes of information and treats an ADPCM byte as a single entity rather than as two 4-bit voice frames.

CVSD works with 1-bit sampling techniques that compare incoming signals with the previous signal. This modulation technique supplies 48 or 96 voice channels. However,

CVSD implementations are vendor-specific and do not work with many AT&T services.

As the use of T-1 spreads, customers expect more flexibility from vendors' offerings. Today's business needs are much different from those of AT&T, formerly the exclusive T-1 user, and the T-1 market is evolving to fulfill those needs. "Customers should purchase the multiplexer with the most intelligence," said Roshan Lal Sharma, an independent consultant at Telecommunications and Network Science in Dallas. Software rather than hardware has become the key means of controlling T-1 multiplexers.

The move to software control supplies customers with two bene-

“Customers should purchase the multiplexer with the most intelligence,” said Roshan Lal Sharma, an independent consultant at Telecommunications and Network Science in Dallas. ”

“Today’s business needs are much different from those of AT&T, which was formerly the exclusive T-1 user. ”

ed to certain types of applications. One distinction is the type or types of voice modulation technique supported. Three modulation techniques are available — Pulse Code Modulation (PCM), Adaptive Differential Pulse Code Modulation (ADPCM) and Continuous Variable Slope Delta (CVSD). PCM works with 8-bit voice frames and supplies 24 64K bit/sec voice channels on a T-1 trunk. ADPCM works with 4-bit voice frames and supplies twice as many channels as PCM. However, ADPCM users may encounter a few problems with the modulation technique. Modems that transmit at speeds of 4.8K bit/sec and higher cannot be used with ADPCM because of framing techniques. Users with a large installed base of modems will probably have to use a different modulation technique. Digital Access and Cross-Connect System

How great
is the
competitive
advantage
N.E.T.
T1 networking
provides?

fits. A company is better able to handle its network and can work with the intelligent services that long-haul carriers have begun to offer. These services include AT&T's Dacs and Customer Controlled Routing (CCR). Dacs is a switching service used at AT&T central offices. CCR enables a customer at a terminal to request these services and reroute lines or reallocate T-1 bandwidth.

To support these types of functions, a multiplexer must package data in D4 frames, which break the 192 bits in one DS-1 frame into 24 bytes. A few vendors have implemented proprietary framing approaches and, because of those approaches, may be unable to support the various services.

In addition to more intelligent network services, multiplexers are able to support more T-1 lines. Recently, Cohesive Network Corp., a Los Gatos, Calif.-based vendor,

announced a device that can support up to 36 T-1 lines. NET has a device able to support 64 lines.

Analysts most often point to these two leading T-1 suppliers. In

addition to the number of lines, their wares are more flexible than traditional offerings. Some features include the ability to allocate bandwidth dynamically and to reroute traffic automatically whenever a node fails. The two companies have garnered much market interest. Cohesive was purchased by Digital Communications Associates, Inc. earlier this month for approximately \$28 million.

NET, a start-up fueled by \$25 million in venture capital, has reportedly gained the attention of IBM. The two companies also have a marketing agreement, although neither company would talk about it. Analysts say that IBM and NET sales representatives are going on joint sales calls, and Big Blue has convinced a few of its customers to purchase NET offerings.

As T-1 networking becomes more flexible, the need for proven network management facilities increases. Full-function network management products are typically the last piece of any communications puzzle. The T-1 market is no exception.

Most vendors offer only rudimentary network management functions, such as monitoring the condition of a line. Typically, a network operator uses a dumb Ascii terminal attached directly to the multiplexer to access this information. An operator may be unable to

So great our customers want to keep it quiet.

Our customer testimonials would be vastly more effective here in this space than our claims about successful private networks.

But our customers don't want their networking successes publicized.

They don't want their competition to know.

So we can't tell you who our customers are in print. But we *can* tell you what they're being so secretive about.

Our IDNX™ transmission resource manager enables our customers to consolidate voice and data traffic over the same network, making for a more manageable, *reliable* communications system. A significant advantage.

T1 private networks based on our IDNX transmission resource management equipment cut communications costs so substantially, payback is generally under a year and return on investment is better than owning blue chip stocks. That makes our customers much more competitive.

But cost savings are only the start. Consider providing new, innovative, competitive communications delivery options—to your company and to your customers. Because with the IDNX system, you will have new tools to create new solutions and improvements that were, until now, simply not economical.

Heady claims, and a number of

vendors are making them. Too few can back their claims with success stories. We can. But not in this ad.

Here's what puts N.E.T. customers ahead:

First: *Functionality*. Data. Voice. (Including compression.) Video. The ability to integrate *any* equipment into an intelligent, expandable private network. With more features and capabilities than alternative equipment. Compare.

Second: *Compatibility*. With existing communications standards. With the emerging ISDN standards. And with all major T1 common carriers. Again, compare.

Third: Unequalled *reliability*. Our technology, through designed-in, non-stop redundancy and an intelligent, self-healing network architecture means our customers' critical applications have *higher availability*—the true measure of reliability. We invite comparison.

Fourth: Our *service*. Beyond maintenance, a system that can be diagnosed quickly, from your offices or our 24-hour-a-day, seven-day-a-week Technical Assistance Center. Down to the board level on any network node. Service that extends to network design and planning. Service that makes the task of building a

private corporate network *practical*. Compare.

Finally: Our *proven* success. With installations all over the U.S., we have solved the thorny problems that are still merely on paper at most of our competitors. By all means, compare.

Call for this free brochure:
1-800-232-5599 Dept. N10
in CA: 1-800-227-5445 Dept. N26

The
critical
T1 issues.
And
answers.

NETWORK
EQUIPMENT TECHNOLOGIES

*“As T-1 networking becomes flexible,
the need for proven management
facilities increases. Full-function
management products are the last
piece of any communications puzzle.
The T-1 market is no exception.”*

*“Most vendors
offer only
rudimentary
network
management
functions, such
as monitoring
the condition
of a line.”*

add or delete a T-1 node without taking the entire network off-line.

A few vendors offer stand-alone network management systems that run on a minicomputer or microcomputer. These systems store data in a data base so users can print out various reports, such as line usage or line performance.

Even the stand-alone network management systems have some limitations. Jeffrey Held, group manager for data communications at Network Strategies, Inc., a Fairfax, Va.-based consulting firm, notes that they cannot be integrated with existing network management facilities. Users have yearned for one network management package that supplies them with all network management information.

Because of NET's relationship with IBM, some analysts predict that its network management facility will soon be integrated with

Continued on page 32

Today's T-1 multiplexers: More power and flexibility

Manufacturer	Model	Maximum number of T-1 lines	Maximum number of channels	Maximum channel speed (bit/sec)	Channel card support	Type of application	Voice modulation technique	Framing technique	Support for digital access cross-connect system	Device access for net management	Remote nodes reconfigurable by user?	Price
Amdahl Corp. Richardson, Texas	2211T	1	96	768K	Voice and data	Point-to-point	CVSD Proprietary technique	D4		Ascii terminal	✓	\$6,000-\$8,000 (box) \$500-\$600 per channel
	2211D	2	96	768K	Voice and data	Network	ADPCM Proprietary	D4	✓	IBM Personal Computer AT	✓	\$7,000-\$8,000 (box) \$1,200 per card
	2211E	16	750	768K	Voice and data	Network	ADPCM Proprietary	D4	✓	IBM Personal Computer AT	✓	\$30,000-\$80,000
Avanti Communications Corp. Newport, R.I.	Accupac	1	2	1.536 M	Data	Point-to-point	No voice	D4 DS-1	✓	None		\$4,000-\$4,500
	Tpac	1	4	1.544 M	Voice and data	Point-to-point	CVSD	DS-1		Ascii terminal	✓	\$8,000
	Ultrapac	1	16 synch 32 asynch	1.536M	Voice and data	Point-to-point	CVSD ADPCM	DS-1		Ascii terminal	✓	\$7,000
	Ultra Mux	10	160 synch 320 asynch	1.544 M	Voice and data	Network	CVSD ADPCM	D4 DS-1	✓	Ascii terminal	✓	\$20,000-\$80,000
Coastcom Concord, Calif.	D/I	2	24 Voice 144 data	1.544 M	Voice and data	Point-to-point	PCM	D4	✓	None		\$2,700-\$26,000
Cohesive Network Corp. Los Gatos, Calif.	CN-1	16	64	1.536 M	Voice and data	Network	PCM ADPCM	D4	✓	Unix-based minicomputer	✓	\$70,000-\$100,000
	CN-2	36	144	1.536 M	Voice and data	Network	PCM ADPCM	D4	✓	Unix-based minicomputer	✓	\$100,000-\$200,000
Datatel, Inc. Cherry Hill, N.J.	PCP 9100	1	96	1.536 M	Voice and data	Point-to-point	PCM CVSD	D4 DS0 switchable	✓	Ascii terminal	✓	\$8,000-\$50,000
General Datacomm Industries, Inc. Middlebury, Conn.	Megamux Plus	1	54	1.152 M	Voice and data	Point-to-point	CVSD ADPCM PCM Proprietary	Proprietary		Ascii terminal	✓	\$8,000-\$21,000
	Megamux 2	8	512	1.152 M	Voice and data	Network	CVSD ADPCM Proprietary	Proprietary		IBM Personal Computer AT	✓	\$25,000-\$75,000
Infotron Systems Corp. Cherry Hill, N.J.	IM 1000	1	64	896 K	Voice and data	Point-to-point	PCM ADPCM	D4	✓	Ascii terminal	✓	\$5,300-\$7,000
	IM 1500	2	128	1.024M	Voice and data	Point-to-point	PCM	D4	✓	IBM Personal Computer or Ascii	✓	\$7,500-\$50,000
	IM 1525	1	24	896 K	Voice and data	Point-to-point	PCM	D4	✓	Ascii terminal	✓	\$7,500-\$30,000
	IM 2500	12	300	896 K	Voice and data	Network	PCM	D4	✓	Minicomputer	✓	\$55,000-\$70,000
Network Equipment Technologies Redwood City, Calif.	IDNX 40	15	512	1.344 M	Voice and data	Network	PCM ADPCM DS-1	D4	✓	IBM Personal Computer AT	✓	\$24,000-\$85,000
	IDNX 60	64	768	1.344 M	Voice and data	Network	PCM ADPCM DS-1	D4	✓	IBM Personal Computer AT	✓	\$28,000-\$250,000
Spectrum Digital Corp. Herndon, Va.	CAD/CAM Mux	1	12	1.536 M	Voice and data	Point-to-point	ADPCM	Proprietary	✓	Ascii terminal	✓	\$10,000
	Mininet	2	112	1.536 M	Voice and data	Network	ADPCM	Proprietary	✓	Ascii terminal	✓	\$25,000-\$40,000
	Net 1.5	8	508	1.536 M	Voice and data	Network	ADPCM	Proprietary	✓	Ascii terminal	✓	\$50,000-\$300,000
Timeplex, Inc. Woodcliff Lake, N.J.	Mini link 1	2	24	1.152 M	Voice and data	Network	ADPCM PCM CVSD	Proprietary	At DS-1 level	Ascii terminal	✓	\$9,000-\$25,000
	Link/1	6	208	1.152 M	Voice and data	Network	ADPCM PCM CVSD	Proprietary	At DS-1 level	IBM Personal Computer	✓	\$12,000-\$100,000
	Link/2	30	208	1.152 M	Voice and data	Network	ADPCM PCM CVSD	D4	✓	IBM Personal Computer	✓	\$25,000-\$120,000

CVSD = Continuously Variable Slope Delta ADPCM = Adaptive Differential Pulse Code Modulation PCM = Pulse Code Modulation

This chart includes a selection of vendors in the T-1 multiplexer market. Most vendors produce other multiplexers, and many vendors not included manufacture a full range of competitive products.

From **page 31**
IBM's Netview. When IBM announced Netview, the company also published its network management standards. All vendors are now able to send network management to the IBM package. How many will opt for such an approach is questionable.
Another network management problem concerns obtaining diagnostic information about T-1 links. T-1 facilities were initially designed for voice, which can function at lower line quality than data. AT&T has proposed a new framing technique, Extended Super Framing (ESF), which should supply more diagnostic information than existing framing techniques.

Some multiplexers currently support ESF.
However, it is available on very few T-1 lines because AT&T has to retrofit central office facilities so they can work with the new framing sequence.
A key management item is the in-

“Some multiplexers currently support ESF. However, it is available on very few T-1 lines because AT&T has to retrofit central office facilities so they can work with the new framing sequence.”

tegration of voice and data departments. John Doggett, vice-president of telecommunications at Bank of Boston, listed this item as the most significant challenge a company faces as it moves to T-1. The two departments will share one facility. Unless both groups are working together, the T-1 implementation could hurt rather than help the company.
T-1 sales are growing rapidly, with annual growth rates estimated at 25% to 50%. The number of vendors is also increasing. But, the market is relatively small, with 1985 revenue estimates ranging from \$90 million to \$200 million. Consolidation seems likely as ISDN moves from theory to reality. □

Qualification Form for Free Subscriptions.

Please answer ALL QUESTIONS, sign and date the card.

Free subscriptions will be accepted only from individuals in the U.S. and Canada with active professional or managerial responsibilities in communications. The publisher reserves the right to limit the number of free subscriptions accepted in any business category. To qualify, you must answer all the questions below completely, **sign and date this form.**

If address has changed, attach mailing label with old address here.

☐ Address Change ☐ New subscription

First Name	Middle Initial	Last Name
Your Title		
Company Name		
Div. Dept.		
Street Address		
City	State	Zip Code

Is the above your home address? ☐ Yes ☐ No

I wish to receive a subscription to *Network World*: ☐ Yes ☐ No

Signature _____

Title _____ Date _____

Business Phone (_____) _____

PLEASE ANSWER ALL QUESTIONS, SIGN AND DATE THE CARD.

- 1 My primary areas of activity.** Circle ONE only.
- 1 am involved in evaluating communications (data, voice and /or image) products and services:
1. for *use within my own* company/organization
 2. for *resale* to other companies/organizations
 3. Both

1a For communications, my primary responsibility is: Circle ONE only.

1. Data Communications
2. Voice Communications
3. Both

2 Circle only the ONE title classification which most applies to you.

Company Management

11. Chairman, Pres., Owner, Gen. Mgr., Partner, Director, CIO, VP, Dir. Head of Finance, Admin. Procurement

Communications Management

Data Communications

21. Management
VP, Dir., Mgr., Head, Chief: Data Communications, including Networks, Engineering, Design, R&D, Application Development
22. Supervisory/Staff
Supervisor, Head : Networking, Design, Analysis, Engineering, R&D, Applications, Services

Telecommunications

31. Management
VP, Dir., Mgr., Head, Chief: Telecomm., Voice Comm., including Networks. Engineering, Design, R&D, Application Development
32. Supervisory/Staff
Supervisor, Head: Networks, Design, Analysis, Engineering, R&D, Applications Services

Factory Communications

41. Management
42. Supervisory/Staff

MIS/Data Processing

51. Management
VP, Dir., Mgr., Head, Chief: MIS/DP, Systems Application Development, Operations, Office Automation
52. Supervisory/Staff: Supervisor, Head of System Design, Analysis, Applications

Others

75. Consultant
80. Educator
85. Financial Analyst
90. Marketing/Sales
95. Other _____

- 3 Job Function**
Which one of the following best describes your functional involvement with communications (data, voice, and/or video) products? Circle ONE only.

Corporate

1. Business Management, Planning and/or Development

Communications System/Network

2. Management, Planning and/or Development
3. Implementation and/or Operation
4. Other _____

- 4 Which one of the following best describes the primary business activity of your organization at this location?** Circle ONE only.

Consultants

11. DP/Communications Consulting Services
12. Consulting Services (except DP/Communications)

End Users

13. Manufacturer (other than computer/communications)
22. Finance/Banking/Insurance/Real Estate
23. Education
24. Medicine/Law
25. Wholesale/Retail Trade
26. Public Utility/Transportation
27. Mining/Construction/Petroleum Refining/Agriculture/Forestry
28. Business Services (excluding DP/ Communications)
29. Government: Federal
30. Government: State/Local

Vendors

41. Carrier: including AT&T, BOCs, Independent Telcos, Public Data Networks, Intern'l Records Carriers
42. Interconnect
43. Manufacturer Computer/Communications Equipment
44. Value Added Reseller (VAR), Systems House, Systems Integrator
45. Distributor
46. DP/Communications Services (excluding consulting)
95. Other _____

- 5 In which ways do you typically become involved in acquiring communications products (data, voice, and/or video) and services?** Circle ALL that apply.

1. Recommend/Specify
2. Identify/Evaluate Potential Vendors
3. Approve the Acquisition
4. None of the Above

6 Check ALL that apply in columns A and B.

- A. I am personally involved in the acquisition process (specification, selection, approval) for the following products and services:

- B. These products and services are presently in use at this location:

A	B	Product/Services	A	B	Product/Services
<u>Computers</u>			<u>Transmission/Network Services Equipment</u>		
01. ☐	☐	Micros	18. ☐	☐	Microwave
02. ☐	☐	Minis	19. ☐	☐	Satellite Earth Stations
03. ☐	☐	Mainframes	20. ☐	☐	Local Area Networks
<u>Data Communications</u>			21. ☐	☐	Wide Area Networks
04. ☐	☐	Communications Processors	22. ☐	☐	Packet Switching Equipment
05. ☐	☐	Comm./Networks Software	23. ☐	☐	Fiber Optic Equipment
06. ☐	☐	Digital Switching Equipment	<u>Communications Services</u>		
07. ☐	☐	Facsimile	24. ☐	☐	Packet Switching Services
08. ☐	☐	Modems	25. ☐	☐	Cellular Mobile Radio Services
09. ☐	☐	Multiplexers	26. ☐	☐	Electronic Mail
10. ☐	☐	Protocol Converters	27. ☐	☐	Enhanced Services
11. ☐	☐	Network Mgmt. & Control	28. ☐	☐	Centrex
12. ☐	☐	Test Equipment			
13. ☐	☐	3270 Controllers			
<u>Telecommunications</u>					
14. ☐	☐	PBXs			
15. ☐	☐	Key Systems			
16. ☐	☐	Central Office Equipment			
17. ☐	☐	Integrated Voice/Data Terminals			

- 7 Estimated value of communications systems, equipment and services:**

- A. which you helped specify, recommend or approve in last 12 months?
Check only ONE in column A.
- B. which you plan to specify, recommend or approve in next 12 months?
Check only ONE in column B.

A	B	A	B
1. ☐	☐	6. ☐	☐
2. ☐	☐	7. ☐	☐
3. ☐	☐	8. ☐	☐
4. ☐	☐	9. ☐	☐
5. ☐	☐		

- 8 Estimated gross annual revenues for your entire company/Institution:**

Circle only ONE.

1. Over \$1 billion
2. \$100 million to \$1 billion
3. \$5 million to \$100 million
4. Under \$5 million

- 9 Estimated number of total employees at this location:**

Circle only ONE.

1. Over 5,000
2. 1,000-4,999
3. 500-999
4. 250-499
5. 100-249
6. 50-99
7. 20-49
8. 1-19

3A05-36

NWW1

THANK YOU!

Network World
P.O. BOX 1021
SOUTHEASTERN, PA 19398-9979

PLACE
POSTAGE
STAMP
HERE

FOLD HERE AND MAIL TODAY

STOP. Did you do the following:

1. Supply old and new address if address has changed
2. Answer all questions
3. Sign and date form

THANK YOU.

Network World
The Weekly for Leading Users of Communications Products & Services

PLEASE TAPE HERE

► CAPITOL HILL

Dole bill combatants drawing battle lines

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — The lines are becoming more clearly drawn in the debate over whether the U.S. Congress should transfer control of the Modified Final Judgment from the Department of Justice and U.S. District Court to the Federal Communications Commission.

The number of industry opponents to the Federal Telecommunications Act of 1986, introduced by Sen. Robert Dole (R-Kan.) last month, continues to grow. AT&T, MCI Communications Corp., US Sprint Communications Co., Contel Information Systems, Inc. and General DataComm Industries, Inc. recently expressed their opposition to the proposed legislation.

The bill's opponents fear that if the FCC is given authority over the Modified Final Judgment — which delineates the activities of the Bell operating companies — the FCC will allow the BOCs to enter heretofore restricted markets in competition with many of the companies that oppose the shift of authority.

These markets include information services, equipment manufacturing and customer premises equipment sales.

AT&T President and Chief Operating Officer James E. Olson sent a letter opposing the Dole bill to Senate Commerce Committee Chairman John Danforth (R-Mo.). Olson said transferring authority over the Modified Final Judgment would be premature, given the BOCs' continued monopoly over their respective markets.

Danforth solicited written comments from interested parties about the future of the Modified Final Judgment and the idea of allowing the BOCs into new markets. If he becomes convinced the Dole bill is not in the public's best interest, Danforth has made it known he may hold hearings this fall and later introduce his own bill to compete with that of his Senate colleague.

Speaking at the Computer and Communications Industry Association forum here on the Dole legislation last week, Philip Walker, US Sprint/GTE Telenet general regulatory counsel said, "The stated in-

tention of the Dole bill is merely to transfer jurisdiction from [U.S. District Court Judge Harold] Greene's court to the FCC.

"But the clear intent of the bill's sponsors is to obtain quick relief for the BOCs from the [Modified Final Judgment] restrictions, assuming the FCC will grant relief more quickly than the court. The bill should consider from a public policy standpoint when and where these [lines of business] restrictions should be relaxed," he continued.

The BOCs have enjoyed great financial success since divestiture, Walker said, and do not need to expand their scopes of business.

The FCC is the most qualified body to deal with the complex issues surrounding the telecommunications industry, according to Douglas Ginsburg, assistant attorney general for antitrust at the Justice Department. The FCC can address not only antitrust issues, but also technology, international trade, national security and consumer issues, he said, adding Justice should restrict its focus to antitrust issues.

Representatives from Ameritech, Southwestern Bell Corp., Nynex Corp. and GTE Services Corp. all spoke in favor of the bill at the meeting.

"The Dole bill is a vehicle for change," said Ivan Seidenberg, Nynex vice-president for government relations. "There are three fundamentals in this business:

Technology keeps changing; customer expectations, not regulation, produce demand and competition; and rigid rules are not suited to the changing competitive environment."

Given these principles, the FCC is better suited to deal with the changing telecommunications industry, he claimed. The FCC is not offering a panacea, but it has the appropriate processes in place to deal with changing telecommunications issues, Seidenberg added.

Dole would like to see the legislation passed by the end of this congressional term, although many Washington observers believe he has an uphill battle ahead of him. Although the prospect of passage has not dimmed, debate on the legislation could carry over to the next Congress. □

Local nets from page 22

to assign the job of local network manager to a person designated as the distributed data base administrator. The network, however, is usually a departmental resource. In businesses with mainframe computers, it is the mainframe system that collects and stores company-wide data in large data bases. Information is downloaded from the mainframe system to the local-area network for manipulation and analysis, and then it may be returned to the mainframe. The mainframe data base is managed by a data base administrator.

The duties of the data base administrator include making the data available to users and monitoring the system to ensure good data integrity. Often the mainframe administrator has no counterpart at the departmental level. Consequently, multiple versions of data materialize, reports are generated from questionable sources and, overall, data integrity on the local net is lost.

A distributed data base administrator can manage the network and, at the same time, ensure that data is properly handled. The network administrator should work closely with the mainframe administrator and support the mainframe programs. With data integrity maintained at the departmental level, the value of the local net — and perhaps the department — is raised significantly.

Because of the network's close association with the personal computer, local net management is a controversial topic. The friction develops because managing personal computers is, in effect, managing the way a person does the job. So, most enlightened companies support personal computers; they don't manage them.

When a personal computer is attached to a local-area network, the "personal" nature of the machine doesn't have to disappear. Users can still run their own applications and maintain their own disk storage areas. But as the computer communicates and shares information with other computers across the network, the personal computer becomes part of a multiuser system. That requires management. □

Protocols from page 23

cusing on synchronous communications protocols, so official recognition of either MNP or X.PC seems unlikely.

The X.PC protocol is designed to provide personal computer users with a reliable local connection to an X.25 packet network. Tymnet developed X.PC by reducing X.25 enough to make it practical for a personal computer and by making it run asynchronously. X.PC provides reliable dial-up network access with the inherent error-checking capability of X.25. This is a network communications standard rather than a host communications standard. The following are some of X.PC's features:

- Asynchronous dial-up. Although synchronous communications is the technology of choice for big IBM-oriented organizations, asynchronous is still the most economical solution. The installed base of asynchronous devices is immense; the Tymnet public network, for example, has more than 10,000 asynchronous ports.

- Error-free communications. X.PC uses the same error-detection scheme as X.25, where data packets are resent starting with the packet in error.

- Multiple-session capability. X.PC multiplexes, or combines, up to 15 data channels into one physical link — a modem, an RS-232 cable or an interface board. This means a personal computer user can access as many as 15 different hosts and information services simultaneously. This broad access is a particularly attractive standard feature,

especially with the influx of Unix-like, multiuser environments.

- Flexible communications. X.PC is primarily used with the IBM Personal Computer and look-alikes, but a version is available for running on Digital Equipment Corp. VAX computers under Unix, and the protocol can also be ported to Apple Computer, Inc. or AT&T machines.

Based on International Standards Organization and Consultative Committee on International Telephony and Telegraphy standards, X.PC is compatible with X.25 and is a natural for updating to X.32 dial-up in the future.

MNP is a general communications package that can integrate into networks, software or hardware. It establishes procedures for communications between dissimilar hosts. In addition to error-checking capabilities, MNP provides a means of exchanging information about host system type and file system.

Because MNP adheres to the layered structure of the Open System Interconnect (OSI) reference model, individual layers can be changed or omitted without affecting the other layers.

About a year after MNP's initial introduction, Microcom implemented within MNP a multiplexing function using Layer 3 — the network level — of the OSI model. This upgrade allows more sophisticated personal computers with multitasking operating systems and windows to take advantage of MNP. However, users who just want error-free, point-to-point communica-

tions do not need the multiple network feature.

One protocol that is generating significant interest is the Blocked Asynchronous Transmission (Blast) protocol from Communications Research Group. Blast uses a High-Level Data Link Control-like sliding window technique to ensure data integrity. This protocol is available on a software offering of the same name, with versions available for more than 120 different operating systems. Any copy of Blast can communicate with any other copy of Blast, regardless of the operating system or host. In micro-to-mainframe communications, Blast is now beta-testing an LU 6.2-like offering that enables communications to run transparently with any application.

The major problem involving communications protocols is the lack of standardization. When one vendor incorporates MNP in its software, that software becomes virtually useless when the user tries to communicate with software running X.PC. The market is full of communications software that cannot complete error-free transmission with anything other than another copy of the same software.

The goal is for transmissions between personal computers to be carried over packet-switched networks to increase speed and cost efficiencies. If vendors of asynchronous communications software products are successful in transmitting error-free data, communicating between personal computers will be as easy as making a coast-to-coast telephone call. □

► QUARTERLY RESULTS

AT&T's earnings dip

BY MICHAEL FAHEY

Staff Writer

NEW YORK — AT&T last week reported that its second-quarter earnings will be down more than 9%, or \$140 million, due to the recent 26-day Communications Workers of America strike.

The company's preliminary fiscal second-quarter earnings of \$422 million, or 37 cents per common share, is down compared with \$461 million, or 41 cents per share, in the equivalent 1985 period.

AT&T Chairman Charles L. Brown laid the blame for the earnings on the recently settled CWA strike, which he said "badly distorted June results."

Six-month net income was \$952 million, or 84 cents per share, compared with \$815 million, or 72 cents per share, in the first half of 1985.

Revenue was down \$17.132 billion compared with \$16.865 billion in the same 1985 period.

A previously reported change in accounting for pension expenses improved earnings in the quarter by about \$112 million, or 11 cents per share, and by \$212 million, or 20 cents per share, for the first half of the year.

Second-quarter results revealed that revenue from services, primarily long-distance, was 11.9% higher than the \$4.225 billion reported in the second quarter of 1985. □

Farmland from page 4

by staying Lata-pure, the reconfiguration enabled Farmland to reduce the number of dedicated lines between Nebraska and here from seven to three. The company plans to capitalize on similar Lata-pure configurations in seven other Mid-western and Western states.

Employing a Lata-pure strategy is not practical in all of the states served by Farmland's network. "In states that have a great many Lata's, it is very difficult to use a Lata-pure strategy," Younger observed. Texas, Florida and Louisiana are also states in which local rate structures and the great number of Lata's make it impractical for Farmland to employ a Lata-pure network strategy, Younger said. Farmland will use Vsats to serve these

states. The Lata-pure strategy also collapses when there are few customer network locations within a Lata, as is the case for Farmland in the Dakotas, where the company also employs Vsats. All told, Farmland will install 80 two-way Vsat units from Equatorial Communications Co. of Mountain View, Calif.

Because no single strategy is applicable to a wide-ranging network, Younger advised other communications managers with large multi-drop networks to stay abreast of tariff information. "I was familiar with some of the state rates, and when the AT&T costs kept escalating, I knew there were some better rates out there. Taking advantage of them was the problem."

Younger uses a personal computer-based software package from

Ford from page 5

Parker would not divulge details of the options the company is considering.

The recent satellite industry turmoil has slowed the execution of the company's business plan. The Ford Aerospace Communications Corp. subsidiary had planned to sell or lease its satellite transponders to satellite service providers.

In December 1982, Fssc filed for a Federal Communications Commission license for a pair of satellite orbital slots, one for each of its two planned satellites. Fssc spokeswoman Susan Pearce claimed the license was not approved until 2½ years later.

In a move that further complicates the role of Fssc, in September 1984, the division's parent company, Ford Aerospace Communications Corp., received FCC approval to purchase a 70% interest in Starnet Data Systems Co. Starnet is a

Connections Telecommunications, Inc. of West Bridgewater, Mass., to analyze and optimize his network. "You just can't do this by hand," he said.

"The program from Connections allows us to configure the network all different kinds of ways and figure out the best options."

Gerald P. Ryan, president of Connections, pointed out that the Lata-pure strategy employed by Farmland would not be as effective for all networks. In fact, Ryan said that in many states, staying Lata-pure can be more expensive than other configurations. "There are different ways of configuring your network," Ryan said. "It depends on what states your drops are located in and the topology of your network." □

San Diego-based satellite services provider. This blurs the role of Fssc, because Starcom could either lease or buy satellite transponder capacity from any of a number of vendors that currently have satellites in orbit.

"The entire satellite industry is in a state of turmoil, partially because of the launch situation both here and abroad," Pearce asserted. "It is not clear when launch services will become available, how much the services will cost when they become available or when the space shuttle will fly again."

The loss of the Space Shuttle Challenger, coupled with the destruction of two U.S. satellite launch vehicles and the recent mid-air destruction of an Arian rocket, has dealt the entire satellite industry a strong blow ("Launch woes plague Western satellite deployment plans," *Network World*, June 9). Fssc's Pearce said satellite insurance rates have shot up in the months following the space shuttle tragedy.

Insurance woes

"For all intents and purposes, it is very difficult and very expensive to get insurance for satellites," Pearce claimed. "We have received quotes from satellite insurance underwriters that represent as much as 25% to 30% of the value of our satellites," she said.

The satellites are each valued between \$50 to \$70 million dollars, she noted. Satellites are insured for the launch of the space vehicle that carries them and for the period of time the satellite orbits the Earth, Pearce explained.

The Fssc satellites were designed to offer large users a variety of Ku- and C-band communications services. □

Keeping tabs from page 1

their peers or through vendor presentations. In some situations, maverick users spring up in parts of a corporation that have unified its communications planning activity — wresting the purchasing responsibility from those once-autonomous units.

Gene Reilly, strategic development manager for Grumman Data Systems, Inc., a division of Grumman Aerospace Corp., is currently striving to control end-user purchasing within his company. Grumman Aerospace recently underwent a reorganization that centralized most of the corporation's communications functions. Reilly's group is specifically trying to control the spread of small local-area networks. To help combat such local net proliferation, he set up a telecommunications steering committee that will act as a central point of information on purchasing for managers and end users at all Grumman locations.

The committee representatives will be drawn from each Grumman division and will keep watch over voice and data tools installed within the company. It will provide end users with a list of approved hardware and software — and the various applications the software will

fulfill — in the Grumman communications environment.

"In the future, when users have a requirement, they can refer to the list and choose what software package or hardware they need," Reilly said. He added that most product procurements are checked by a corporate purchasing department. But not every division has its own purchasing department. Networking product purchases occasionally slip past communications management or the central corporate information systems department because they are ordered as part of a specific aircraft project. "Each division was accustomed to independence when it came to choosing network tools," Reilly said. "With our current setup, it is possible for an end user to purchase products without central communications management's knowledge."

It is often easier to keep the purchasing activities of end users in check when product procurement is monitored by a corporate purchasing department. Central purchasing also helps keep vendors from trying to sell products to end users without the knowledge of the communications manager.

But the job of grasping total buying control is often a matter of edu-

cating employees. Managers must impress upon workers how the corporation's central procurement philosophy will ensure product consistency.

Camden, N.J.-based Campbell Soup Co. controlled its unauthorized purchasing problem by setting up a corporatewide policy requiring the corporate communications manager's approval on all procurement contracts. The rule extends to all Campbell Soup national and international subsidiaries.

According to Stephen Dennehy, telecommunications manager at Campbell Soup, most unauthorized purchases are for personal computer-related equipment, such as IBM 3270 boards or modems.

"The PCs really did it to everyone in this area," he said. "If end users want something, they can just buy it at Computerland."

Rather than fight with end users and their department managers, communications managers may be better off feeding a feisty user's desire to use new products. Managers claim that the company's most sophisticated end users are the best people to pilot-test products before the product's companywide implementation. In many cases, experimental end users drive the imple-

mentation of new technology in a corporation.

From a network management standpoint, however, product consistency is imperative. Managers recommend keeping abreast of end-user needs so future product purchases can cover any special requirements. Sometimes the functionality the end user wants can be provided by existing equipment. One communications manager, who works for a northeast chemical company and declined to be identified, said users often make product selections based on personal vendor preference or because the product may have a unique function. However, the user may not need the function to do his particular job.

"If a user wants a green modem and the manager is buying red modems, that's just an emotional issue," the communications manager said. "In that case, the communications senior manager and the end user's department manager may have to rule on the problem."

"However, communications managers and end users should try to keep this type of interplay to a minimum," the manager added. "It doesn't look good to have both bosses hassling over a small problem." □

IIN from page 4

selves without having to go through the telephone company's service order process.

Although Eli Lilly is initially interested in IIN to expand its voice facilities, the company also has a long-term goal of integrating voice and data, Otting said. Today the company supports data with data switches. Otting opted for a "plain vanilla conversion" to start, because "if you mess with too many variables on a conversion, you don't know what you have."

Eventually, the company plans to install a fiber-optic backbone network that will connect the company's facilities, carry data, then voice and eventually video conferencing, Otting added.

Before choosing IIN, Lilly also evaluated private branch exchanges. An on-premises PBX promised to provide the richest set of end-user and management features. However, switches were substantially more expensive. Otting was advised by a consultant to evaluate his return on investment over a three-to-five-year time frame.

Otting found that PBXs would have cost \$2.5 million more than using central office equipment. In order to break even, he estimated his company would have had to own a PBX for 10 years.

Lilly will use its present station equipment when the new service is cut over, but Otting anticipates that during 1987 as many as 20% of the company's 7,000 analog telephone handsets will be replaced with digital sets. The migration to digital sets is encouraged by a growing need to support data.

"My data traffic is probably growing 35% to 40% a year," Otting said. He estimates that the company has 6,000 data devices, including 2,000 personal computers, currently in place.

The University of Illinois is also taking a multimedia approach to telecommunications. The school hopes IIN will help it gain more network control, according to John McManus, assistant vice-president of telecommunications. IIN will link the university's Urbana and Chicago campuses, as well as the College of Medicine programs at Rockford and Peoria.

The university is planning to run voice, data and video transmission over the same distribution system, which will service residence halls, as well as research and lecture facilities. The total system is expected to cost \$30 million.

Cutover is scheduled for March 1987 in Urbana, and April for the Chicago campus. For the first month, the new system will be operated in parallel with the existing telecommunications system, McManus said.

Every building on the university's Urbana campus is currently being recabled with IIN's three-pair wiring, as well as another four-pair wiring intended for local-area networking within each building. Fiber-optic and coaxial cables will connect buildings and gateways will be used to link one medium to another, McManus said.

Fiber will be used for high-speed computer-to-computer communications, particularly among research facilities, and also to provide special services. These services include high-speed access to centralized laser printers and file storage devices.

In addition to owning its own distribution system, the university also anticipates the new telecommunications system will save \$20 million over the next decade. Both McManus and Otting see the use of IIN as a good compromise between owning a switch and letting the telephone company control the switch. Within five years, however, Otting anticipates it may be more cost-effective for a company to own its own switch. □

Net management from page 2

tem more than a year ago, according to Michael Lake, technical manager of data communications. The company has customer training facilities in Chicago, Los Angeles and Huntsville, Ala. These facilities are connected by AT&T analog lines and RCA American Communications, Inc. satellite links to the software company's IBM mainframe in Natick.

Because customers pay for the training, it is important to make sure that the lines are continuously up and running. The company wanted one vendor to supply both a network management package and the necessary modems. Products from three vendors, Codex, Racal-Milgo, Inc. and General DataComm

Industries, Inc. were examined.

McCormack & Dodge chose Codex because it was the only company that could supply the network management capability and 19.2K bit/sec modems. Lake is satisfied with the Codex system, which has been operating for two months.

Gerald P. Ryan, president of Connections Telecommunications, Inc., a consulting firm in W. Bridgewater, Mass., noted that two factors are fostering growth in the mid-range network management market. First, network management systems are dropping in price. Second, smaller companies are realizing cost savings.

"Companies are finding they can save a lot of money by running their own network," Ryan said. □

Mark Your **FREE** Calendar For

COMMUNICATION NETWORKS '87

February 9-12, 1987

Washington Convention Center, Washington, D.C.

Fill out and return the coupon below to get your FREE CN '87 pocket calendar so you won't miss the 9th Annual Communication Networks.

CN '87 promises to be the largest conference and exposition ever, offering a telecommunications forum where the most vital issues are discussed by users, carriers, vendors, and policymakers. Last year, CN '86 was a proven success with over 300 exhibiting companies and 15,000 attendees.

Each day offers you useful, practical information — effective ways to deal with the constant changes in voice and data communications you'll face in 1987.

Monday, February 9th

Offers a full day of introductory and advanced "in-depth" seminars that deal with the latest facts, concepts and changes in the telecommunications industry that will affect your job.

Tuesday, February 10th-Thursday, February 12th

You can choose from more than 75 conference sessions over three days all designed to give you a broad perspective on every aspect of modern telecommunications use, management and regulation.

The exhibits alone will be an education. On Tuesday through Thursday you can compare new products and services offered by some of the world's leading companies with over 1,000 booths displaying new applications and top service equipment.

Be prepared for the telecommunications industry's new applications, technologies, and market challenges in 1987 — attend CN '87.

**For your FREE calendar, fill out the coupon below and return it to:
CN '87, Box 9171, Framingham, MA 01701-9171.**

☐ **YES**, I want to learn more about the Communication Networks '87 Conference and Exposition.

Please send me information on: ☐ Exhibiting ☐ Attending

Please send me the information I've requested and my FREE 1987 pocket calendar to:



Name _____

Title _____

Company _____

Address _____

City/State/Zip _____

Phone _____

NWW1

Communication Networks is produced by CW/Conference Management Group a division of CW Communications/Inc., publishers of *Network World* and *Computerworld*, 375 Cochituate Rd., Box 9171, Framingham, MA 01701-9171.

Calendar

July 21-22, San Diego — The IBM PC XT/AT: Maximizing its Potential. Also, July 23-24, Denver; July 31-Aug. 1, Washington, D.C.; Aug. 25-26, Boston. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

July 21-22, Boston — T-1 Networking and Bypass. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

July 21-22, New York — Communications I: Technology Overview. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 21-23, Sacramento, Calif. — Hands-On Data Communications: An Advanced Approach. Also, July 21-23, Chicago. Contact: The American Institute, Carnegie Building, 55 Main St., Madison, N.J. 07940.

July 21-23, Washington, D.C. — Hands-On Troubleshooting. Contact: The American Institute, Inc., Carnegie Building, 55 Main St., Madison, N.J. 07940.

July 23-25, Morristown, N.J. — Data Communications: Fundamentals and Beyond. Also, July 30-Aug. 1, Los Angeles; Aug. 6-8, Anchorage, Alaska; Aug. 13-15, Boston; Aug. 20-22, Indianapolis. Contact: The American Institute, Inc., Carnegie Building, 55 Main St., Madison, N.J. 07940.

July 24-25, Washington, D.C. — Integrated Data Networks: Fiction or Reality? Contact: Ramcor, Inc., 800 Follin Lane, Vienna, Va. 22180.

July 24-25, Hartford, Conn. — Data Communications and Networking for the IBM PC XT/At and Other Compatibles. Also, July 28-29, New York. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

July 24-25, Morristown, N.J. — Networking the IBM PC or Compatibles. Also, July 28-29, Boston; Aug. 4-5, Kansas City, Mo.; Aug. 11-12, Minneapolis. Contact: The American Institute, Inc., Carnegie Building, 55 Main St., Madison, N.J. 07940.

July 24-25, San Francisco — Advanced Communications Architectures Seminar. Also, Aug. 19-20, Washington, D.C. Contact: Communications Solutions, Inc., 992 South Saratoga-Sunnyvale Road, San Jose, Calif. 95129.

July 28-29, Dallas — Introduction to Telecommunications Sys-

tems: Technologies and Applications. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

July 28-Aug. 1, Washington, D.C. — Internet Systems and Protocols. Contact: The George Washington University Continuing Engineering Education Program, Washington, D.C. 20052.

July 29-30, San Francisco — Financial Analysis for Telecommunications Equipment Acquisition. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

July 30-Aug. 1, Arlington, Va. — Internetworking and Advanced Protocols. Contact: Center for Advanced Professional Education, Suite 210, 1820 E. Garry St., Santa Ana, Calif. 92705.

Aug. 4-6, New York — Telecommunications Management. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Aug. 4-8 and 7-8, Santa Cruz, Calif. — Images: Technologies, Applications, Processing and Systems. Contact: The Institute in Computer Science, University of California Extension, Santa Cruz, Calif. 90564.

Aug. 6-7, Chicago — Fiber Optics in Plain English. Contact: Clifford, Inc., 83 Main St., Bethel, Vt. 05032.

Aug. 6-8, New York — Fiber-Optic Communications. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Aug. 6-8, Scottsdale, Ariz. — Data Communications. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

Aug. 11-12, New York — Fundamentals of Data Processing for Administrative Assistants and Secretaries. Contact: New York University School of Continuing Education, Seminar Center, 575 Madison Ave., New York, N.Y. 10022.

Aug. 11-13, Washington, D.C. — Controlling Corporate Network Costs. Contact: Telestrategies, 1355 Beverly Road, McLean, Va. 22101.

Aug. 11-15, Philadelphia — CICS/VS Advanced Programming/Design. Contact: Computer Assistance, Inc., Suite 480, 1150 1st Ave., Valley Forge Plaza, King of Prussia, Pa. 19406.

Advertisers Index

Astrocom	16
AT&T Information Systems	40
BBN	10
Cleo Software	8
General Datacom	20-21
ITT/B&CC	5
Micom	12-13
Network Equipment Technologies	30-31
Randolph Computer	26
Simware	18
Tautron	28
Timplex	3

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Network World Sales Offices

Robert P. Pavone
National Sales Director

Pam Valentinas
Manager/Marketing
& Sales Operations

Karen Wallace
Account Coordinator
375 Cochituate Road.
P.O. Box 9171
Framingham, MA 01701-9171
(617) 879-0700

BOSTON

Maureen Sebastian
375 Cochituate Road.
P.O. Box 9171
Framingham, MA 01701-9171
(617) 879-0700

NEW YORK

Eleanor Angone
Joseph Viviani
Paramus Plaza I
140 Route 17 North
Paramus, NJ 07652
(201) 967-1350

WASHINGTON, D.C.

Gordon DuChes
20608 Beaver Ridge Road
Gaithersburg, MD 20879
(301) 921-9085

SAN FRANCISCO

Chris Clyne
1060 Marsh Road, Suite C-200
Menlo Park, CA 94025
(415) 328-4602

ATLANTA

Tom Tolbert
1400 Lake Hearn Drive, Suite 330
Atlanta, GA 30319
(404) 394-7509

CHICAGO

Fran Jonikaitis
2600 South River Road, Suite 304
Des Plaines, IL 60018
(312) 827-4433

LOS ANGELES

David Beardslee
18004 Sky Park Circle, Suite 100
Irvine, CA 92714
(714) 545-7278

CLASSIFIED ADVERTISING

Gina Ciampa
375 Cochituate Rd.
Framingham, MA 01701-9171
(617) 879-0700

Network World is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes over 50 computer publications in more than 20 major countries. Nine million people read one or more of the group's publications each month. Members of CWCI group contribute to the Computerworld News Service, a daily on-line service offering the latest on domestic and international computer news. Members of the group include: ARGENTINA'S Computerworld/Argentina; ASIA'S Asian Computerworld; AUSTRALIA'S Computerworld Australia, Australian PC World and Macworld; BRAZIL'S DataNews, and PC Mundo; CHINA'S China Computerworld and China Computerworld Monthly; DENMARK'S Computerworld/Danmark, PC World and Run (Commodore); FINLAND'S Mikro; FRANCE'S Le Monde Informatique, Golden (Apple), OPC (IBM), Theoreme and Distributique; GERMANY'S Computerwoche, Infowelt, PC Welt, Computer Business, and Run; ITALY'S Computerworld Italia and PC Magazine; JAPAN'S Computerworld Japan; MEXICO'S Computerworld/Mexico; THE NETHERLAND'S Computerworld Netherlands and PC World; NORWAY'S Computerworld Norge and PC Mikrodata; SPAIN'S Computerworld Espana, PC World and Commodore World; SWEDEN'S ComputerSweden, Mikrodata, and Svenska PC World; SWITZERLAND'S Computerworld Schweiz; THE UNITED KINGDOM'S Computer News, PC Business World, and Computer Business; VENEZUELA'S Computerworld Venezuela; the U.S. Amiga World, Computerworld, inCider, Infoworld, MacWorld, Micro Marketworld, PC World, Run, 73 Magazine, 80 Micro, Focus Publications and Network World.

CAREER ANNOUNCEMENTS

This is a sampling of our Classified Advertising section. For more information on Classified Advertising please fill-in and return the form below or contact Network World, Advertising Department at CW Communications, Inc., 1-800-343-6474 or in Massachusetts (617) 879-0700.

Telecommunications Technical Analyst - Senior

Qualifications: Bachelor's degree of five years experience in voice communications. Must have been in the systems planning, systems development and implementation in large PABX or support environments.

This is a sampling of our classified advertising section. This is a sampling of our classified advertising section. This is a sampling of our classified advertising section. This is a sampling of our classified advertising section.

Manager, Technology Projects - Networks

Seeking experienced manager. The successful candidate will manage a staff of 15 technical professionals as well as provide overall direction on the telecommunications activities associated with our technology center.

You should have 5 years experience in telecommunications networking, including voice and data. Strong project management abilities and proven analytical skills.

DATA COMMUNICATIONS MANAGER

If you are an aggressive self starter who enjoys challenge, we may have the position for you.

At least three years of professional involvement with data communications support. Strong leadership is needed.

This is a sampling of our classified advertising section. This is a sampling of our classified advertising section. This is a sampling of our classified advertising section. This is a sampling of our classified advertising section.

MANAGER CORPORATE INFORMATION

Position is responsible for developing and managing external information that focus on telecommunications trends.

This is a sampling of our classified advertising section. This is a sampling of our classified advertising section.

DIRECTOR NETWORK PLANNING

The qualified candidate will be an undergraduate with graduate level preferred. A strong background in network planning and management in switching and transmission is required.

This is a sampling of our classified advertising section. This is a sampling of our classified advertising section.

TELECOMMUNICATIONS MANAGER

Responsible for engineering analysis of telephone utilities and issues. Requires engineering degree and two years of experience.

Responsible for engineering analysis of telephone utilities and issues. Requires engineering degree and two years of experience.

Responsible for engineering analysis of telephone utilities and issues. Requires engineering degree and two years of experience.

This is a sampling of our classified advertising section. This is a sampling of our classified advertising section. This is a sampling of our classified advertising section. This is a sampling of our classified advertising section.

CLASSIFIED ADVERTISING Information Form

Name _____

Title _____

Company _____

Address _____

Telephone No. _____

- ☐ Please send me more information on Classified Advertising.
- ☐ Please have someone call me with information.

Return to: **NETWORK WORLD**
Classified Advertising
375 Cochituate Road
Framingham, MA 01701

Letters

Graphics and video standards

I was surprised to see some glaring errors regarding video standards nomenclature in the article "The beauty of artful integration," (*Network World*, June 23). The author refers twice to the "North Texas standard color format," described as a 525-line video format. While the acronym is NTSC, it actually represents the term National Standard Television Code, the U.S. television standard, which has the stated 525-line (vertical) resolution.

I am also unaware that there is any red, green, blue standard that is 1100 lines in resolution. The current "most affordable" high-resolution graphics consist of a resolution of 1024 by 768. Those color graphics systems that achieve 1536 or 2048 resolution are, for most users, prohibitively expensive. Craig Paul
systems analyst
Computer Center
Kansas University

Editor's note: Mr. Paul has framed a perfectly valid point about a nomenclature mistake in a shroud of acronym similarities. However, his suggested spelling-out of NTSC, an acronym representing the 525-line video format, is also incorrect. NTSC stands for National Television Standards Committee.

In the article regarding integration of video and computer graphics at Mary Kay Cosmetics ("The beauty of artful integration," *Network World*, June 23), I was somewhat perplexed by the elaborate system developed to provide communications between two sites 500 feet apart. Wouldn't it have been much simpler (keep it simple, stupid) to march those 100 executives into a single room and utilize conventional projection facilities? The walk would do them good.

Thomas E. Gibson
director
Communications Division
County of Montgomery
Pennsylvania

BOCs out of touch

I concur entirely with the sentiments expressed in "The search for integrity" (*Network World*, June 16). I have advised Michigan Bell, AT&T Information Systems and AT&T Communications, Inc. repeatedly that their executives, virtually without exception, are out of touch with their customers. When does one ever meet a second-level manager? Does anyone know of a third level?

As Mr. Carlini pointed out,

merely obtaining the name of the second-level [manager] who might be able to assist you is virtually impossible, probably due to their years of accountability only to the regulators.

Only when the regional Bell operating companies realize that they are responsible to their customers will they reach their potential. Until that time, we customers will attempt to advise them of the realities of the world by taking our business to the competition.

J. R. Rossow

Deregulatory mujahadeen

As a student of regulatory affairs, I can honestly say that Northwestern Bell Corp. attorney Ron Slyter's article on intrastate telephone deregulation ("Should intrastate telephone rates be deregulated?," *Network World*, June 16) is the most sophisticated piece on the topic I have read. It looks silly next to Nebraska commissioner Harold Simpson's rebuttal, which sticks to the hard facts of utility life.

Slyter goes so far as to recommend that "customers should require regulators to return to the consumer the power to approve telephone services, prices and suppliers." I was not aware that consumers ever had such power. It's certainly not in the U.S. Constitution or the statutes. Just what empirical evidence, historical or organizational, is Slyter citing when he makes such a wild claim?

The American system of telecommunications, like every similar system around the world, evolved with the assistance of significant public intervention. The argument for a radically deregulated environment is dangerous for the industry and its consumers and has all the earmarks of religious dogma. The deregulatory mujahadeen [or warriors for a cause] within the telephone industry should be seen as the cultists they have become.

Robert Jacobson
principal consultant to the California Legislature's Assembly Committee on Utilities and Commerce
Sacramento, Calif.

The article "Repeaters link Ethernet segments" (*Network World*, July 14) incorrectly listed the name of American Photonics, Inc.

James Waylus' name was also misspelled. Waylus is chairman and chief executive officer of American Photonics.

Termination from page 1

charges AT&T assesses customers that terminate long-term equipment leases before the agreements expire.

Communications consultants contacted by *Network World* claim they have numerous clients that are currently mulling over the sticky issue ("Users girding for AT&T lease fight," *Network World*, July 14).

However, most users declined to discuss their situations for fear of inciting the legal wrath of AT&T, which claimed it will sue those refusing to pay the termination

charges. On June 18, the California Superior Court issued a ruling that prevented members of the Los Angeles-based Pacific Consulting Group from advising AT&T customers not to pay termination charges.

Users question the legality of equipment lease contracts that were initially inked with local telephone companies and later assigned to AT&T as part of divestiture. The Federal Communications Commission remanded the issue to the state courts. The Commonwealth of Massachusetts has not yet been presented with a termination charge dispute.

The Massachusetts user, who requested anonymity for himself and the city involved, said he had not ruled out challenging the legality of the lease agreement in court. "The city signed the contract for the lease of the PBX with New England Telephone [& Telegraph Co.], not with AT&T," he argued.

Before going to court, however,

the communications manager said he will force AT&T's hand by requesting that the company submit a document describing the legality of the termination charge. "I am not going to voluntarily pay a bill for some \$35,000 to \$40,000 without a good degree of legal work," the telecommunications director asserted. "I want to know exactly how [AT&T] thinks it can legally pass this fee onto users." The telecommunications department has retained legal counsel, which will research the sensitive issue and recommend a course of action.

The telecommunications director said the city would not be interested in investing \$100,000 to dispute the legality of a charge of \$35,000 to \$40,000.

"But," he added, "if there was a prudent risk and if my counsel thought we could spend \$10,000 to

\$15,000 on such an action, I would ask the city if we should proceed with this action."

The city would also consider joining a class action suit against AT&T to refute the legality of the equipment contract termination charge if such a suit were filed. Joining the suit would require approval from the department's legal counsel, he explained.

The city has already signed a contract for a Northern Telecom, Inc. Meridian SL-1 that will replace its AT&T Dimension 400 PBX. The Northern Telecom PBX will be installed early this fall, at which time the city's telecommunications director will send AT&T a document informing AT&T that the switch will be disconnected. □

*"The city
would
consider a
class action
suit against
AT&T."*

US Sprint from page 4

customers are residential users.

US Sprint's lineup will include:

- DS1 Private Line Service, a T-1 1.54M bit/sec digital service that reportedly offers 99.5% error-free transmission and bit error rates of 10 to the negative seventh. In some areas of the country, the company can offer the service end-to-end over fiber-optic facilities.

- Sprint Ultra Wats, which was introduced recently by GTE Sprint as Advanced Wats Plus. This is a competitor to AT&T's Megacom and MCI's Prism service targeted at business users that spend at least \$10,000 per month on Wats service.

- Sprint Advanced Wats, which, like Ultra Wats, is a virtually banded service. This means that it is tariffed to resemble AT&T's banded Wats service, but does not require Wats trunks to be dedicated to the service of a particular band or region of the country.

- In-Sprint, a toll-free service held over from GTE Sprint.

- Private-line services, formerly offered by both companies.

Another holdover from GTE Sprint is an accounting code billing service the company claims is

unique in the industry. These codes enable corporate accounts to segment their bills as they wish, divided according to branch offices or even at the departmental level.

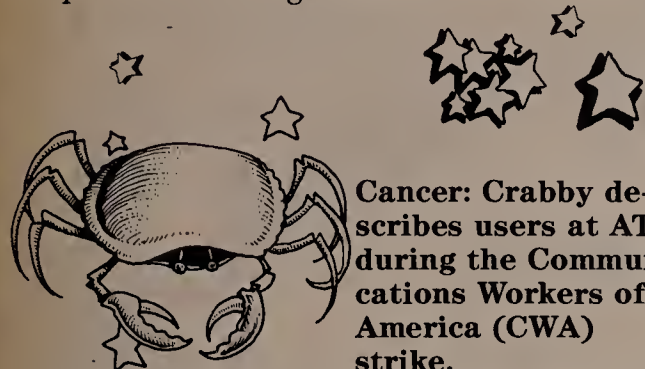
The company will also offer users that log more than \$150-worth of usage per month free automatic dialers. In areas that have not been updated for equal access, or for users that have another primary long-distance carrier, these dialers enable single-digit access to US Sprint. They automatically dial the access codes and account nodes needed to get into the US Sprint network. They are not required if US Sprint is installed as the user's primary long-distance carrier.

The US Sprint spokesman said GTE oversold its network in the last two years and was struggling to install satellite links and microwave shots to accommodate new subscribers. US Telecom, he said, started out later than GTE, had a smaller customer base and early on launched ambitious fiber-optic network installation goals. "GTE Sprint brought the customer base to US Sprint and US Telecom brought the fiber network capacity," he said. □

HORRELLSCOPES

BY EDWARD HORRELL

In communications today, it takes more than just good business sense to survive; it requires celestial guidance.



Cancer: Crabby describes users at AT&T during the Communications Workers of America (CWA) strike.

The strike had two major impacts on the telecommunications universe. First, it proved AT&T could get along better than expected without its overload of personnel. Second, the contract finally signed by these warring worlds apparently will not break the bank for other companies. While this prediction may be tested when the Bell operating companies face off with the CWA, it appears that AT&T's new contract will be the star for other negotiators to follow.

The only ones who lost during the strike were the expected losers: callers who use AT&T operator service regularly and are accustomed to prompt, accurate service.

One Kentucky coal executive vacationing in South Carolina was forced to make a number of credit card calls. He rattled off his card number to an AT&T manager sitting in for a striking operator. He waited, repeated it, waited and repeated it again. On the fourth attempt, he complained, "I usually don't have this kind of trouble to contend with."

"Neither do I!" shot back the frustrated manager on the other end of the line.



Taurus: Bullish management seems to be disappearing at Rolm Corp. since IBM assumed command.

That may be the reason the usually aggressive, fast-

moving private branch exchange company is reacting like an orbiting planet rather than a shooting star to the bad press it's been getting lately.

Rolm has been a legitimate superstar in the past. But since IBM took over, the California company has been losing its brightest stars to its competitors. Rolm's middle management is especially mobile these days.

There's a lot of speculation about why such an exodus from Rolm is occurring. Meanwhile, there have been drops in sales as well as some bad vibes about the introduction of a new switch.

But in the past, Rolm has been able to overcome its problems with quick marketing response, and somehow the company has always been able to stay ahead. Now it's defensive and slow to act.

That's a shame. Rolm has good products, good service, good backing and until recently, good management. However, the present cosmic storm won't stop Rolm from spinning on its axis.

Horrell is president of Mitchell & Horrell, Inc. in Memphis, Tenn.



Gemini: Twin companies are benefitting from the bailout at Rolm.

Visitors to the International Communications Association meeting might have noticed a large number of Rolm managers hanging around the MCI Corp. booth. This could have been perfectly innocent, of course. Since a lot of Rolm's brightest comets have gravitated to MCI, perhaps these other Rolmulans were just visiting old friends.

On the other hand, it could be that they were checking out the atmosphere at MCI to see if it might offer more breathing space.

MCI, switching from a price leader to a service leader in the competition against AT&T, needs the sharpest sales force in the galaxy, and choosing from the stars at Rolm might just be the answer.

The other company benefitting from the Rolm bailout is Stratacom in Cupertino, Calif. Dick Moley, the former marketing heart of Rolm, is leaving the company to become chief executive officer at Stratacom, a fledgling T-1

network management company. More predictions regarding Moley fall under the sign of Pisces.



Pisces: The fish who is too smart to get caught in the IBM net is Stratacom's new chief executive, Dick Moley.

Moley, an Englishman who is considered brilliant by many, is bound

to mold this T-1 network startup into a powerful force in the telecommunications galaxy.

A true Piscean leader (born March 10, 1939), Moley was the architect of the business plan that took Rolm from a new PBX company to a billion-dollar satellite of IBM. No doubt after that, the thrill was gone at Rolm. Especially after Ken Oshman, Rolm's former president and the big daddy of all true Rolmulans, left the company. Moley is a slick fish who won't let another company get in front of Stratacom. In addition to pulling in Moley, Stratacom is positioning itself to provide networking equipment for the T-1 market. This is the hottest part of the telecommunications universe these days, and a product announcement slated for July is bound to realign a few planets.

Like all Pisceans, Moley needs to be free of restraints if his spirit of adventure is to flourish. At Rolm, he had that freedom. When IBM took over, he couldn't breathe. Moley's sign indicates he's destined to succeed at anything he feels is important. The stars say Stratacom is a winner.



Cosmic catastrophe of the month.

This month's catastrophe is a front-running contender for catastrophe of the year honors.

The award goes to legislation proposed by U.S. Sen. Robert Dole (R-Kan.) that would shift the management of the AT&T breakup from U.S. District Court Judge Harold Greene to the Federal Communications Commission. Dole, of course, is acting as second lunny lieutenant to the cosmic captain, Ronald Reagan.

Dole's proposal would let the BOCs participate in businesses they would otherwise be prohibited from entering, such as real estate, Kewpie dolls and the like.

Greene has resisted pressures to let the BOCs expand. Now as reward for his courageous position, Dole and the cosmic captain want to take the matter out of his hands. Big mistake.

The primary benefactors of the lunny lieutenant's legislation are the BOCs, which are revving their rockets to blast off into uncharted worlds. Certainly no consumer will benefit from such exploration. And vendors can't imagine what good will come of it.

It's only the lobbyists who can once again pat themselves on the back for being the real force in Washington.

Sober reflection will reveal that the only idea that could possibly have been worse would be to combine the post office and the nation's telecom system.

Dole's proposal is worth writing your congressman about — providing the post office doesn't lose your letter, deliver it next year or return it to you postage due.



Capricorn: This is the sign of Northern Telecom, Inc., which is getting its distributors' goats.

The favorite indoor sport of Northern Telecom distributors is to gripe, gripe and gripe.

Many who have orbited around this company for a long time say they are going to blast out as soon as possible. This will start a veritable explosion of distributors from the company.

Not that Northern Telecom hasn't been warned about the problems with lack of exclusivity for vendors selling their outstanding product line. With such demand for their products, it's too confusing for users to pick a vendor from all those who handle Northern products. Which does Northern suggest in a particular city? Which gives the best service?

Northern needs to endorse a vendor and award territorial rights before there are no customers left who care.

A drama is unfolding in the BOC ranks. One major BOC tells Horrellscopes it intends to "dump Northern as soon as possible." This cosmic upheaval might be good news for companies such as CXC Corp., NEC Corp., Intecom, Inc. and perhaps that sentimental favorite, Rolm.

CXC will be big with the BOCs if the problems with its Rose PBX are corrected, and Intecom's recent marriage to Wang Laboratories, Inc. makes it a growing contender. NEC will also tighten its orbits around the BOCs, and the gravitational pull of the BOC market may be too strong for Rolm to resist.



HOW AT&T COMPUTERS ARE HELPING TRAILWAYS ON THE ROAD AND DOWN THE ROAD.

WE MAKE THE PIECES FIT.

The smooth, efficient flow of transportation often depends on the smooth, efficient flow of information. That's why the Trailways Corporation depends on AT&T.

To make the most efficient use of their fleet of buses, Trailways needed a customized computer system. AT&T provided it. AT&T 3B2 Computers in their Dallas headquarters are linked to AT&T PC 6300s in the field, allowing Trailways' management to keep close tabs on over 1200 buses serving forty-

two states. With up-to-the-minute information at their fingertips, they can respond more quickly to changing traffic and weather patterns.

Trailways is also ready for the long haul. The AT&T computers they have today can grow and change to meet their future automation needs. That's why we call them "the computers with the future built in."

AT&T computers and information systems can also help your business reach its long-term goals. To find out how, call us at 1 800 247-1212.

© 1986 AT&T Information Systems


AT&T

The right choice.